United States
Department of
Agriculture

Cooperative State
Research Service

# Food and Agriculture Competitively Awarded Research and Education Grants

## Fiscal Year 1989

# FOOD AND AGRICULTURE COMPETITIVELY AWARDED RESEARCH AND EDUCATION GRANTS FISCAL YEAR 1989

UNITED STATES
DEPARTMENT OF
AGRICULTURE

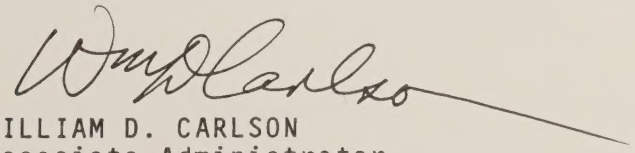
PREPARED BY THE OFFICE OF GRANTS
AND PROGRAM SYSTEMS, COOPERATIVE
STATE RESEARCH SERVICE

JANUARY 1990

FOREWORD

To maintain our competitiveness in agriculture in the world marketplace, scientific research holds the key. This is accomplished through a number of programs including research support distributed to universities on a formula basis through the Cooperative State Research Service. This publication reports the support provided through the following grant programs: Competitive, Special, Rangeland, and Small Business Innovation Research, as well as the Food and Agricultural Sciences National Needs Graduate Fellowships.

The Competitive Research Grants Program was developed to bring to bear upon agricultural research needs the best scientists in the Nation. Qualified scientists both inside and outside of the traditional agricultural research system may compete for and receive these grants. The focus is on agriculturally oriented fundamental research to discover the information needed before further important and necessary breakthroughs can be made in the applied research program. The programs include biotechnology, animal sciences, insect sciences, plant sciences, stratospheric ozone depletion, and human nutrition.

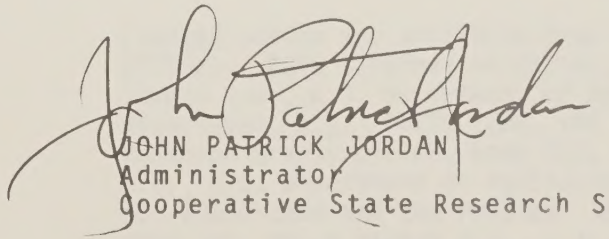


WILLIAM D. CARLSON
Associate Administrator
Office of Grants and Program Systems
Cooperative State Research Service

The Special Research Grants Program addresses a number of agricultural areas of national and regional concern such as animal health and aquaculture, which are awarded on a competitive basis.

The USDA National Needs Graduate Training Grants Program, initiated in 1984, has achieved a notable record and is proving to be an important part of the solution to the serious erosion of our food and agricultural scientific expertise. The FY 1989 National Needs Graduate Fellowships Program supported pre-doctoral fellows in the areas of bioprocessing or food/agricultural engineering; plant and animal biotechnology; food, forest products, or agribusiness marketing; food science/human nutrition; and water sciences.

It is our belief that this combination of research and fellowship programs to attack significant and difficult problems in agricultural science provides the broad knowledge base necessary to reduce costs and solve pressing problems to keep U.S. agriculture strong, resilient, and competitive.



JOHN PATRICK JORDAN
Administrator
Cooperative State Research Service

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This publication was prepared by the Awards Management Division Staff, Office of Grants and Program Systems, Cooperative State Research Service, U.S. Department of Agriculture.

Limited copies are available from the following offices: CSRS Information Office, Room 328, 901 D Street S.W., U.S. Department of Agriculture, Washington, D.C. 20250-2200, the Competitive Research Grants Office, Room 323, 901 D Street S.W., U.S. Department of Agriculture, Washington, DC 20250-2200 and the Proposal Services Branch, Room 303, 901 D Street S.W., U.S. Department of Agriculture, Washington, DC 20250-2200.

FOOD AND AGRICULTURE
COMPETITIVELY AWARDED RESEARCH AND EDUCATION GRANTS
FISCAL YEAR 1989

## THE GRANTS PROGRAMS

The research grants programs of science and education under which the competitive selection process was used during fiscal year 1989 were the following:

1. Competitive Research Grants Program to support basic research in the food and agricultural sciences.

2. Special Research Grants Program to support research deemed by Congress and the Department of Agriculture to be of particular importance to the Nation.

3. Rangeland Research Grants Program to support basic research in certain areas of rangeland research.

These sources of funding supplement and complement funding of Federal agricultural research and the basic State research institution formula funding by Congress to help maintain a viable, effective, ongoing State-Federal agricultural research capability for this country.

In addition, grants were awarded competitively under the following programs:

4. Small Business Innovation Research Program, a primary aim of which is to stimulate technological innovation in the private sector.

5. Food and Agricultural Sciences National Needs Graduate Fellowships Grants Program to help develop professional and scientific expertise in the food and agricultural sciences.

Grant funds for all of the above programs are administered through the Cooperative State Research Service.

Guidelines for grants to be awarded competitively are published annually in the Federal Register, usually near the end of each fiscal year. The guidelines identify selected research areas, anticipated funding levels, and requirements for the submission of proposals.

Single copies or annual or semiannual subscriptions for the Federal Register are available for a small charge from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

If you want further information on programmatic aspects of these grants, contact:

Dr. William D. Carlson
Associate Administrator
Office of Grants and Program Systems
Cooperative State Research Service
U.S. Department of Agriculture
14th and Independence Avenue, S.W.
Washington, D.C. 20250

If you want information on administrative aspects of these grants, contact:

Mr. Terry J. Pacovsky
Director
Awards Management Division
Office of Grants and Program Systems
Cooperative State Research Service
U.S. Department of Agriculture
Washington, D.C. 20251-2200

The following are listings of awards (arranged by program areas) for fiscal year 1989. Please note that some of these awards are renewals/amendments to existing projects and are identifiable by agreement periods starting prior to October 1, 1988.

COMPETITIVE RESEARCH GRANTS PROGRAM

The following tabulation lists the funds awarded in the various areas in fiscal year 1989 under the Competitive Research Grants Program.

| | | |
|---|---|---|
| Plant Science | | $ 7,584,000 |
| Alcohol Fuels | $ 487,272 | |
| Soybean Research | 467,364 | |
| Genetic Mechanisms | 1,141,000 | |
| Plant Pathology/Weeds | 1,227,250 | |
| Entomology/Nematology | 1,562,250 | |
| Nitrogen Fixation Metabolism | 1,482,957 | |
| Photosynthesis | 1,215,907 | |
| Biotechnology (Animal and Plant) | | $ 18,027,168 |
| Response to Biological Stress | 3,600,500 | |
| Plant Molecular Biology | 4,349,168 | |
| Plant Growth and Development | 2,900,000 | |
| Response to Physical Stress | 1,775,000 | |
| Plant Science Centers | 300,000 | |
| Animal Growth and Development | 2,102,500 | |
| Animal Molecular Biology | 3,000,000 | |
| Animal Science | | $ 5,688,000 |
| Human Nutrition | | $ 948,000 |
| Pest Science | | $ 1,896,000 |
| Stratospheric Ozone Depletion | | $ 3,507,600 |
| TOTAL | | $37,650,768 |

This program is administered under the authority of Section 2(b) of P.L. 89-106, 7 U.S.C. 450i(b), as amended by Section 1414(b) of P.L. 95-113 and Section 1415(a) of P.L. 97-98, and in accordance with Sections 6301-6308 of P.L. 97-258. Section 1419 of P.L. 95-113, as amended, authorized grants for the Alcohol Fuels Research Program.

U.S. colleges and universities, other research institutions, Federal agencies, private organizations or corporations, and individuals may submit proposals.

## PLANT SCIENCE

Grants are awarded in four broad areas of research in plant biology: nitrogen fixation metabolism, biological stress on plants, genetic mechanisms for crop improvement, and photosynthesis. In addition, a small number of grants are awarded in the alcohol fuels research and soybean program areas. A brief description of each area of research, with a listing of research grants made during fiscal year 1989, follows.

Additional research grants covering the four broad areas of plant science and focusing on biotechnology are awarded under the Biotechnology program and listed in the Biotechnology section in this book. Proposals addressing similar scientific problems were reviewed by a single technical advisory panel regardless of the source of funds for the grants.

## PLANT SCIENCE - NITROGEN FIXATION METABOLISM

Grants in this area support research to find ways to naturally increase the nitrogen available to plants. Lack of nitrogen for plant growth is the most common limiting factor in crop agriculture. This research will contribute to understanding nitrogen-fixing mechanisms in both symbiotic and free-living organisms, as well as the fate of fixed nitrogen.

The objective of this research is to build a foundation of basic information concerning nitrogen fixation, related nitrogen metabolism and nitrogen cycling. This information should help in the enhancement of the process in currently known systems and provide a base for developing new nitrogen-fixing associations, by genetic transfer or other means, for crop species not now possessing such capability.

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS Pac. West Area<br>Albany, CA 94710 | William E. Newton | 89-37120-4803<br>8902203 | $100,000 | 09/15/89<br>09/30/91 | Altered MoFe Proteins of Azotobacter vinelandii Nitrogenase |
| University of California<br>Berkeley, CA 94720 | John B. Neilands | 88-37120-3889<br>8902612 | $55,000 | 09/01/88<br>08/31/90 | Structure and Biology of Rhizobactin 1021 |
| University of California<br>Irvine, CA 92717 | Barbara K. Burgess | 89-37120-4678<br>8902213 | $120,000 | 08/01/89<br>07/31/91 | Substrate Reactions of Nitrogenase |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Connecticut<br>Storrs, CT 06269-2086 | David R. Benson | 89-37120-4824<br>8902251 | $90,000 | 09/01/89<br>08/31/91 | Developmental Biology of Frankia |
| Southern Illinois University<br>Carbondale, IL 62901 | Michael T. Madigan | 89-37120-4886<br>8902183 | $100,000 | 09/01/89<br>08/31/91 | N2 Fixation and Nitrogen Metabolism in Heliobacteria |
| Northwestern University<br>Evanston, IL 60201 | Brian M. Hoffman | 87-CRCR-1-2430<br>8902614 | $60,000 | 08/01/87<br>07/31/90 | Single-crystal and Solution ENDOR Studies of Nitrogenase |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Jeffrey T. Bolin | 89-37120-4786<br>8902236 | $130,000 | 09/01/89<br>08/31/91 | Three-Dimensional Structure of Nitrogenase |
| Michigan State University<br>East Lansing, MI 48824 | Thomas L. Deits | 89-37120-4757<br>8902238 | $100,000 | 09/01/89<br>08/31/91 | Soybean Nodule Glutamine: PRPP Amidotransferase: Purification and Properties |
| Michigan State University<br>East Lansing, MI 48824 | Robert P. Hausinger | 89-37120-4842<br>8902262 | $100,000 | 09/01/89<br>08/31/91 | Enhancement of Urea Fertilizer Efficiency |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Missouri Columbia, MO 65211 | David W. Emerich | 89-37120-4742 8902218 | $96,800 | 09/01/89 08/31/91 | Symbiotic Nitrogen Fixation: The Role of Malate Dehydrogenase |
| University of Missouri Columbia, MO 65211 | Dale G. Blevins | 89-37120-4765 8902215 | $40,000 | 09/01/89 08/31/90 | Ureide Metabolism in Nodulated Soybeans |
| Washington University St. Louis, MO 63130 | Georgia Shearer | 89-37120-4743 8902249 | $90,000 | 09/01/89 08/31/91 | Mechanism of Denitrification: N isotopic discrimination & 18o Exchange |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Dartmouth College Hanover, NH 03755 | Dean E. Wilcox | 89-37120-4804 8902246 | $100,000 | 09/01/89 08/31/91 | The Catalytic Mechanism of Urease |
| Ohio State University Research Foundation Columbus, OH 43212 | John G. Streeter | 89-37120-4750 8902204 | $40,000 | 09/01/89 08/31/90 | A Possible Mechanism for the Regulation of Gas Diffusion in Legume Nodules |
| Ohio State University Research Foundation Columbus, OH 43212 | Wolfgang D. Bauer | 89-37120-4753 8902257 | $15,008 | 09/15/89 09/30/90 | Mechanisms Regulating Nodulation Formation in Soybean |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oregon State University Corvallis, OR 97331 | Peter J. Bottomley | 89-37120-4738 8902112 | $90,000 | 08/15/89 08/31/91 | Impact of Water Stress on Nodulation by Soil-Borne Rhizobium Trifolii |
| Texas A&M Research Foundation College Station, TX 77843 | K. A. VandenBosch | 89-37120-4785 8902233 | $60,000 | 09/01/89 08/31/90 | Secretion of Two Symbiosis-related Glycoproteins by Clover Roots |
| Virginia Polytechnic Institute and State University Blacksburg, VA 24061 | Dennis R. Dean | 87-CRCR-1-2459 8902582 | $60,000 | 09/01/87 08/31/90 | Analysis of Azotobacter vinelandii Nitrogen Fixation-Specific Genes and Their Products |

Competitive Research Grants Program
Plant Science - Nitrogen Fixation Metabolism

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin* Madison, WI 53706 | Jo Handelsman | S89-37262-4746* 8902207 | $36,149* | 09/01/89 08/31/91 | Identification of Competitiveness Genes in Rhizobium leguminosarum bv. phaseoli |

TOTAL : $ 1,482,957

*Grant split-funded with the Biotechnology-Plant Molecular Biology area where actual count is included. Total amount awarded $90,000.

## PLANT SCIENCE - BIOLOGICAL STRESS (ON PLANTS)
## ENTOMOLOGY/NEMATOLOGY

Research grants in this area support studies on plant stress arising from interactions with insects, nematodes, or mites. The ultimate goal of the program is to support research which will lead to ways of reducing losses in plant productivity from damage caused by these organisms.

Research on plant/invertebrate interactions is encouraged as is research into the basic biology of these particular invertebrates. Specific emphasis is placed on but not limited to the following areas: 1) mechanisms of plant defense and resistance against invertebrate attack (biochemical or genetic); 2) invertebrate growth, development, and reproduction (physiological, biochemical or molecular studies); 3) physiological and ecological interactions of invertebrate control agents with their hosts (includes beneficial insects, viruses, bacteria, fungi, and other organisms); 4) chemical ecology and behavior; 5) population dynamics (includes evolutionary studies); and 6) fundamental basis of pesticide toxicity and resistance.

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arkansas* Fayetteville, AR 72701 | Rose C. Gergerich | 89-37153-4559* 8900965 | $96,250* | 09/01/89 08/31/91 | Plant Virus Interactions with Beetle Vectors and Plants During Transmission |
| University of California Davis, CA 95616 | Bruce A. Jaffee | 89-37153-4422 8900989 | $35,000 | 09/15/89 09/30/91 | Epidemiological Approach to Biological Control of Plant- Parasitic Nematodes |
| University of Delaware Newark, DE 19711 | Thomas K. Wood | 89-37153-4466 8900839 | $100,000 | 07/01/89 06/30/91 | Endogenous Plant Wounding Responses to Insect Eggs |

*Grant split-funded with Biotechnology-Response to Stress area. Total amount awarded $100,000.

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS South Atlantic Area<br>Athens, GA 30613 | James H. Tumlinson | 89-37153-4490<br>8900881 | $100,000 | 09/15/89<br>09/30/91 | Biosynthesis of Conjugated Dienal and Trienal Sex Pheromones by Manduca Sexta |
| University of Illinois<br>Urbana, IL 61801 | Michael E. Irwin | 89-37153-4491<br>8900357 | $120,000 | 07/01/89<br>06/30/91 | Meterological Factors that Govern the Vertical Zonation of Rhopalosiphum maidis |
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | S. Suzanne Nielsen | 89-37153-4353<br>8900840 | $100,000 | 09/01/89<br>08/31/91 | Relation Between Legume Cysteine Protease Inhibitor and Insect Digestive Protease |

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Kentucky Research Foundation Lexington, KY 40506-0057 | Kenneth F. Haynes | 89-37153-4354 8901008 | $60,000 | 07/01/89 06/30/90 | Redundancy in Chemical Communication |
| An Individual Award Lexington, KY 40502 | Randy E. Hunt | 89-37153-4558 8900968 | $66,000 | 09/15/89 09/30/91 | Leafhopper Mating Behavior: Impact on Habitat Selection and Plant Disease Spread |
| University of Massachusetts Amherst, MA 01003 | Ronald J. Prokopy | 87-CRCR-1-2385 8902591 | $50,000 | 09/01/87 08/31/90 | Food Foraging Behavior of Apple Maggot and Mediterranean Fruit Flies |

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Massachusetts Amherst, MA 01003 | Ronald J. Prokopy | 89-37153-4361 8900901 | $50,000 | 07/01/89 06/30/90 | Tephritid Fly Movement and Patch Use in Relation to Interacting and Variable Resources |
| University of Nebraska Lincoln, NE 68588-0430 | Anthony Joern | 89-37153-4467 8900960 | $160,000 | 06/01/89 05/31/92 | Interactions Between Abiotic Stresses and Grasshopper Herbivory |
| Ohio State University Research Foundation Columbus, OH 43212 | David J. Horn | 89-37153-4348 8900917 | $120,000 | 07/01/89 06/30/91 | Validation of a Stochastic Model for Optimizing Greenhouse Pest Management |

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oklahoma State University<br>Stillwater, OK 74078-0500 | Andrew J. Mort | 87-CRCR-1-2378<br>8902606 | $50,000 | 08/01/87<br>07/31/90 | Molecular Adaptations for Greenbug Resistance Under Drought |
| Oregon State University<br>Corvallis, OR 97331 | Jeffrey C. Miller | 89-37153-4421<br>8900993 | $100,000 | 07/01/89<br>06/30/91 | Host Plant Regulation of Development and Detoxication in Herbivore and Parasitoid |
| South Dakota State University<br>Brookings, SD 57007 | Catherine D. Carter | 89-37153-4943<br>8902678 | $100,000 | 09/15/89<br>09/30/91 | Genetic Control of Sesquiterpenes for Host-Plant Resistance in Lycopersicon |

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Texas<br>Austin, TX 78712-1111 | Mary A. Rankin | 87-CRCR-1-2413<br>8902596 | $50,000 | 09/01/87<br>08/31/90 | The Cost of Migration in Melanoplus Sanguinipes |
| Washington State University<br>Pullman, WA 99164-5045 | Kemet D. Spence | 87-CRCR-1-2386<br>8902498 | $50,000 | 08/01/87<br>07/31/90 | Regulation and Mode of Action of a Coagulation-initiating Protein |
| Washington State University<br>Pullman, WA 99164-5045 | John N. Thompson | 89-37153-4468<br>8900340 | $50,000 | 07/01/89<br>06/30/90 | Evolutionary Genetics of Oviposition Preference in Phytophagous Insects |

Competitive Research Grants Program
Biological Stress - Entomology/Nematology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Washington<br>Seattle, WA 98195 | Peter M. Kareiva | 89-37153-4489<br>8900961 | $105,000 | 07/01/89<br>06/30/91 | Comparing the Hunting Abilities of Prospective Biocontrol Agents |

TOTAL : $ 1,562,250

## PLANT SCIENCE - BIOLOGICAL STRESS (ON PLANTS) PLANT PATHOLOGY/WEEDS

Research grants in this program support studies on stress on plants arising from their interactions with other plants and other microbial agents including fungi, bacteria, viruses, and mycoplasma-like organisms. The ultimate goal is to reduce losses in plant productivity from damage caused by biologically generated stresses.

Emphasis in this area is on studies that will enhance understanding of how stressful interactions are established between plants and other biological agents; how such interactions are influenced by environment and other factors inherent to the interacting organisms; how the interactions reduce plant productivity and usefulness to man; how plants react to stress generated by such interactions; and how the damage of such interactions may be reduced or eliminated.

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Tuskegee University* Tuskegee, AL 36088 | C. S. Prakash | S89-37263-4813* 8900679 | $15,250* | 09/01/89 08/31/91 | Somaclonal Variation for Disease Resistance and Genome Modification |
| USDA/ARS Pac. West Area Albany, CA 94710 | Linda S. Thomashow | 89-37151-4470 8900843 | $100,000 | 06/01/89 05/31/91 | Expression of Phenazine Biosynthesis Genes by Pseudomonas spp. |
| University of California Berkeley, CA 94720 | Thomas R. Gordon | 89-37151-4487 8900694 | $100,000 | 08/01/89 07/31/91 | Microevolution and Intraspecific Phylogeography of Fusarium oxysporum |

*Grant split-funded with the Biotechnology-Response to Biological Stress area where actual count is included. Total amount awarded $100,000.

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Berkeley, CA 94720 | Fields W. Cobb | 89-37151-4787 8900462 | $75,000 | 09/01/89 08/31/90 | Genetic Interactions in an Endemic Forest Pathosystem |
| University of Florida Gainesville, FL 32611 | Monica E. Elliot | 89-37151-4864 8900525 | $46,000 | 09/01/89 02/28/91 | Antibiotic Production by Rhizosphere-Competent Streptomycetes |
| USDA/ARS Mid-West Area Peoria, IL 61604 | Christen D. Upper | 89-37151-4823 8900430 | $6,000 | 09/15/89 09/30/90 | The Fifth International Symposium on the Microbiology of the Phyllosphere |

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Kentucky Research Foundation Lexington, KY 40506-0057 | Malcolm R. Siegel | 88-37151-3860 8902536 | $50,000 | 07/01/88 06/30/90 | Manipulation of the Fungal Endophyte for use in Control of Pests |
| USDA/ARS Beltsville Area Beltsville, MD 20705 | C. J. Baker | 88-37151-3694 8902523 | $55,000 | 07/01/88 06/30/90 | Role of Active Oxygen in Host Pathogen Recognition |
| Northeast Missouri State University Kirksville, MO 63501 | Nicholas R. Jordan | 89-37151-4888 8900523 | $65,000 | 09/15/89 09/30/91 | Triazine-resistant Cytoplasm: Effects on Ecophysiology and Fitness in the Field |

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University* Ithaca, NY 14853 | Alan Collmer | 87-CRCR-1-2592* 8902459 | $90,000* | 07/01/89 06/30/91 | Genetics of Pectate Lyase Isozymes and Pathogenicity in Erwinia chrysanthemi |
| Cornell University Ithaca, NY 14853 | William E. Fry | 89-37151-4477 8900688 | $75,000 | 07/01/89 06/30/90 | Population Genetics of Phytophthora infestans |
| Cornell University* Ithaca, NY 14853 | William E. Fry | 89-37151-4477* 8902663 | $0* | 07/01/89 06/30/91 | Population Genetics of Phytophthora Infestans |

*Grant split-funded with Biotechnology-Response to Biological Stress area. Total amount awarded $75,000.

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | Wayne A. Sinclair | 89-37151-4557<br>8900435 | $80,000 | 09/01/89<br>08/31/91 | Ecology of Mycoplasmal Pathogens of Ash and Elm as Revealed by Cloned DNA Probes |
| Cornell University<br>Ithaca, NY 14853 | Herbert W. Israel | 89-37151-4682<br>8900437 | $60,000 | 09/15/89<br>09/30/91 | In Situ Localization of the Victorin Receptor Site in Oats |
| Oregon State University<br>Corvallis, OR 97331 | Steven R. Radosevich | 89-37151-4465<br>8900601 | $100,000 | 09/15/89<br>09/30/91 | Process Influencing the Dynamics of Herbicide Resistance in Lolium Multiflorum |

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Washington State University Pullman, WA 99164-5045 | Eugene P. Fuerst | 89-37151-4488 8900527 | $100,000 | 09/15/89 06/30/91 | Sequestration as a Mechanism of Paraquat Resistance in Weeds |
| University of Washington Seattle, WA 98195 | Peter M. Kareiva | 89-37151-4650 8900821 | $120,000 | 07/01/89 06/30/91 | Experimental and Theoretical Studies of the Spatial Spread of Genes Through Weeds |
| University of Washington* Seattle, WA 98195 | Peter M. Kareiva | 89-37151-4650* 8902670 | $0* | 07/01/89 06/30/92 | Experimental and Theoretical Studies of the Spatial Spread of Genes through Weeds |

*Grant split-funded with Biotechnology-Response to Biological Stress area. Total amount awarded $27,000.

Competitive Research Grants Program
Biological Stress - Plant Pathology/Weeds

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin<br>Madison, WI 53706 | John H. Andrews | 89-37151-4637<br>8900576 | $90,000 | 08/01/89<br>07/31/91 | Resident vs. Transient Phyllosphere Fungal Antagonists |

TOTAL : $ 1,227,250

## PLANT SCIENCE - GENETIC MECHANISMS

This program covers the broad area of plant genetics. The goal of the program area is to encourage quality research projects that will contribute to the increased basic understanding of biological phenomena relevant to the development of superior varieties of agricultural crops. New and innovative experimental approaches are emphasized at all levels including the molecular, biochemical, cellular and whole plant levels. The research areas that are given high priority are: (a) acquisition of basic information on the structure, function and expression of plant nuclear organellar genes, (b) development of methods for gene transfer and genetic engineering, (c) development of new methods for producing and selecting agronomically important quantitative and qualitative traits, (d) identification of plant characteristics or genes which are important targets for genetic manipulation, and (e) genetic studies on the alteration and utilization of unadapted and wild germplasm using new and novel approaches.

Competitive Research Grants Program
Plant Science - Genetic Mechanisms

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | Thomas J. McCoy | 89-37140-4386<br>8900632 | $158,000 | 09/01/89<br>08/31/92 | Use of Homoeologous Medicago Genomes in Alfalfa Genetics and Breeding |
| University of California<br>Davis, CA 95616 | Jan Dvorak | 89-37140-4556<br>8900728 | $187,000 | 07/01/89<br>06/30/92 | Chromosome and Genetic Instability in Polyploids |
| USDA/ARS South Atlantic Area<br>Athens, GA 30613 | Charles W. Stuber | 89-37140-4449<br>8900446 | $180,000 | 09/15/89<br>09/30/92 | Molecular Marker Facilitated Transfer of QTL Alleles between Elite Maize Lines |

Competitive Research Grants Program
Plant Science - Genetic Mechanisms

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Iowa State University of Science and Technology Ames, IA 50011 | Donald S. Robertson | 89-37140-4335 8902420 | $85,000 | 05/01/89 04/30/90 | Isolation of Genes for Quantitative Inheritance in Maize |
| University of Iowa Iowa City, IA 52242 | Wayne R. Carlson | 86-CRCR-1-2122 8902331 | $10,000 | 09/15/86 10/31/89 | New Applications for B-A Translocations in Maize |
| University of Iowa Iowa City, IA 52242 | Wayne R. Carlson | 89-37140-4464 8900333 | $90,000 | 06/01/89 05/31/91 | New Applications of the Maize B Chromosome |

Competitive Research Grants Program
Plant Science - Genetic Mechanisms

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Illinois State University<br>Normal, IL 61761 | David F. Weber | 89-37140-4863<br>8900544 | $60,000 | 09/15/89<br>09/30/91 | Cytogenetic Analysis of RFLP loci in Maize |
| USDA/ARS Mid-West Area<br>Peoria, IL 61604 | John P. Helgeson | 89-37140-4532<br>8900581 | $120,000 | 08/01/89<br>07/31/91 | Somatic Fusions in Solanum: Introgression of DNA into Fertile Breeding Lines |
| Kansas State University<br>Manhattan, KS 66506 | Bikram S. Gill | 89-37140-4862<br>8900440 | $100,000 | 09/01/89<br>08/31/91 | Genetically-induced Chromosome Deletion Mapping in Wheat |

Competitive Research Grants Program
Plant Science - Genetic Mechanisms

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Nebraska<br>Lincoln, NE 68588-0430 | Paul E. Staswick | 87-CRCR-1-2300<br>8902463 | $68,000 | 07/01/87<br>06/30/90 | Structure and Expression of Soybean Leaf Storage Protein Genes |
| Washington State University*<br>Pullman, WA 99164-5045 | Gynheung An | S89-37262-4892*<br>8900530 | $3,000* | 09/15/89<br>09/30/91 | Molecular Mechanisms Controlling Wound-Inducible Gene Expression |
| University of Wisconsin<br>Madison, WI 53706 | Thomas C. Osborn | 89-37140-4636<br>8900532 | $80,000 | 08/15/89<br>08/31/91 | Cytoplasmic Effects on Nuclear Genome Stabilization in Brassica Amphidiploids |

TOTAL : $ 1,141,000

*Grant split-funded with the Biotechnology-Plant Molecular Biology area where actual count is included. Total amount awarded $130,008.

## PLANT SCIENCE - PHOTOSYNTHESIS

Grants in this area focus on a better understanding of photosynthesis and associated carbon metabolism. Photosynthesis is the process that crop plants use to convert solar energy into carbohydrates that plants and animals use for growth and development.

The program's aim is to cover such areas as the mechanisms of energy capture and conversion, structure, synthesis, and turnover of the photosynthetic apparatus, $CO_2$ fixation, photorespiration, and dark respiration. Other areas included in this program are projects on the relation of plant development to photosynthesis, including development of photosynthetic competence, translocation and partitioning of photosynthetic products; and design of whole leaf and whole plant structures best suited for photosynthetic productivity. Another area set forth for proposals is the design of new methods of genetic and cellular manipulation to improve photosynthetic efficiency in plants--including studies of the chloroplast genome, nuclear genes regulating photosynthesis, and analysis of regulatory steps controlling both nuclear and cytoplasmic genome expression and their interactions.

Competitive Research Grants Program
Plant Science - Photosynthesis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arkansas Fayetteville, AR 72701 | Danny J. Davis | 89-37130-4531 8900893 | $100,000 | 08/01/89 07/31/91 | Protein-Protein Interactions in Photosynthesis |
| Iowa State University of Science and Technology Ames, IA 50011 | Martin H. Spalding | 89-37130-4618 8900792 | $100,000 | 07/01/89 06/30/91 | Chlamydomonas Mutants Defective in the CO2 concentrating Pathway |
| Purdue Research Fdn. West Lafayette, IN 47907 | Thomas L. Housley | 89-37130-4749 8900824 | $63,657 | 08/01/89 07/31/90 | Fructan Metabolism in Wheat |

Competitive Research Grants Program
Plant Science - Photosynthesis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Michigan<br>Ann Arbor, MI 48109 | Robert R. Sharp | 89-37130-4655<br>8900875 | $125,000 | 09/01/89<br>08/31/91 | Manganese Redox Chemistry in Photosynthetic Oxygen Evolution |
| Michigan State University<br>East Lansing, MI 48824 | Gerald T. Babcock | 87-CRCR-1-2313<br>8902489 | $70,000 | 06/01/87<br>05/31/90 | Charge Separation and Stabilization in Chloroplast Photosystem II |
| University of Minnesota<br>St. Paul, MN 55104 | Bridgette A. Barry | 89-37130-4887<br>8900653 | $20,000 | 08/15/89<br>11/30/89 | EPR and Difference FT-IR Studies of Photosynthetic Reaction Centers |

Competitive Research Grants Program
Plant Science - Photosynthesis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Nebraska Lincoln, NE 68583-0704 | John P. Markwell | 88-37130-4582 8900641 | $105,000 | 08/01/89 07/31/91 | Biosynthesis of Chlorophyll b |
| University of Nevada Reno, NV 89557 | Jeffrey R. Seemann | 89-37130-4679 8900757 | $100,000 | 09/01/89 08/31/91 | Metabolism of 2 Carboxyarabinitol 1 Phosphate and Regulation of Rubisco Activity |
| State University of New York* Buffalo, NY 14260 | James O. Berry | S89-37262-4893* 8900802 | $17,250* | 09/01/89 08/31/91 | Molecular Biology of C4 Photosynthesis in Grain Amaranth |

*Grant split-funded with the Biotechnology-Plant Molecular Biology area where actual count is included. Total amount awarded $100,000.

Competitive Research Grants Program
Plant Science - Photosynthesis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | Richard E. McCarty | 89-37130-4543<br>8900408 | $100,000 | 09/01/89<br>08/31/91 | Permeability Properties of the Inner Envelope Membrane of Chloroplasts |
| Oklahoma State University<br>Stillwater, OK 74078-0500 | Chang-An Yu | 89-37130-4555<br>8900851 | $100,000 | 07/01/89<br>06/30/91 | Quinone Binding Sites in Photosynthetic Electron Transfer Complexes |
| Texas Tech University<br>Lubbock, TX 79409 | David B. Knaff | 87-CRCR-1-2333<br>8902460 | $70,000 | 09/01/87<br>08/31/90 | Protein Complexes in Photosynthetic Electron Transfer Reactions |

Competitive Research Grants Program
Plant Science - Photosynthesis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Utah State University Logan, UT 84322 | Keith A. Mott | 89-37130-4741 8900770 | $80,000 | 09/01/89 08/31/91 | Limitation of Non steady State Photosynthesis by Rubisco |
| University of Wisconsin Madison, WI 53706 | Marion H. O'Leary | 89-37130-4542 8900602 | $100,000 | 07/01/89 06/30/91 | Mechanism of Action of Phosphoenolpyruvate Carboxylase |
| Medical College of Wisconsin, Inc. Milwaukee, WI 53226 | Henry M. Miziorko | 88-37234-3367 8902615 | $65,000 | 09/01/88 08/31/90 | Regulated Enzymes in CO2 Fixation: Mechanisms of Activation & Catalysis |

TOTAL : $ 1,215,907

## PLANT SCIENCE - SOYBEAN RESEARCH

The overall goal of this program area is to support long-term, basic biological research on soybeans that can generate new ideas, new knowledge, and innovative technologies which ultimately will contribute to increased productivity and quality of the soybean crop. This program encourages innovative studies on: (1) physiology, genetics, and biochemistry of soybeans, (2) the mechanisms of interactions between soybean and its pests, and (3) the Rhizobium-soybean symbiosis.

Proposals on soybean research were submitted to appropriate plant science programs for review according to the scientific content of the proposal. The grants listed below were selected from those proposals deemed highly meritorious by appropriate review panels.

Additional research grants using soybean as an experimental system can be found in other plant science and biotechnology programs.

Competitive Research Grants Program
Plant Science - Soybean Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | Robert W. Pearcy | 89-37231-4469<br>8900850 | $100,000 | 06/15/89<br>06/30/91 | Regulation of the Photosynthetic Use of Sunflecks in Plant Canopies |
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Virginia R. Ferris | 89-37231-4492<br>8900913 | $100,000 | 09/15/89<br>09/30/91 | 2-D Proteins and DNA Comparisons in Soybean Cyst and Related Nematodes |
| University of Kentucky<br>Research Foundation<br>Lexington, KY 40506-0057 | Todd W. Pfeiffer | 89-37231-4455<br>8900407 | $105,000 | 09/15/89<br>09/30/92 | Artificial Selection: Establishing Benefits of Unequal Parental Contributions |

Competitive Research Grants Program
Plant Science - Soybean Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS Beltsville Area<br>Beltsville, MD 20705 | Donald L. Keister | 89-37231-4314<br>8900448 | $3,000 | 04/15/89<br>10/31/89 | Symposium on the Rhizosphere and Plant Growth |
| USDA/ARS Beltsville Area*<br>Beltsville, MD 20705 | Eliot M. Herman | 89-37231-4460*<br>8901104 | $79,364* | 07/01/89<br>06/30/92 | The Ontogeny of Soybean Seed and Leaf Oil Bodies |
| Ohio State University Research Foundation<br>Columbus, OH 43212 | Terrence L. Graham | 89-37231-4493<br>8900487 | $80,000 | 08/01/89<br>07/31/91 | Role of Phytoalexins in Soybean Resistance to Phytophthora |

TOTAL : $ 467,364

*Grant split-funded with Biotechnology-Plant Growth Development area. Total amount awarded $149,000.

## PLANT SCIENCE - ALCOHOL FUELS

This program supports research activities related to the physiological, microbiological, biochemical, and genetic processes controlling the biological conversion of agriculturally important biomass material to alcohol fuels and industrial hydrocarbons. Studies on factors which limit efficiency of biological production of alcohol fuels and means of overcoming these limitations are also encouraged.

Competitive Research Grants Program
Plant Science - Alcohol Fuels

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | Linda F. Bisson | 89-37233-4825<br>8901796 | $60,000 | 09/01/89<br>08/31/92 | Cloning of a Yeast Xylose Transporter Gene and Expression in Saccharomyces |
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Nancy W. Ho | 89-37233-4890<br>8901786 | $109,000 | 09/01/89<br>08/31/91 | Improvement of Yeast Alcohol Fermentation via Genetic Engineering |
| Rutgers, The State University<br>New Brunswick, NJ 08903 | Douglas E. Eveleigh | 89-37233-4889<br>8901649 | $126,000 | 09/01/89<br>08/31/91 | Fuel Alcohol from Zymomonas: Secretion of Hydrolases |

Competitive Research Grants Program
Plant Science - Alcohol Fuels

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | David B. Wilson | 89-37233-4865<br>8901757 | $45,000 | 09/01/89<br>08/31/90 | The Molecular Mechanisms of Synergism during Enzymatic Hyrolysis of Cellulose |
| William Marsh Rice University<br>Houston, TX 77251-1892 | George N. Bennett | 89-37233-4833<br>8901738 | $147,272 | 09/01/89<br>08/31/92 | Molecular Mechanism of Regulation of Solvent Production in C. acetobutylicum |

TOTAL : $ 487,272

## STRATOSPHERIC OZONE DEPLETION

As part of a Government-wide effort to address the issue of depletion of stratospheric ozone, this program area is designed to investigate the effect of increased ultraviolet radiation resulting from ozone depletion on crop and forest species. The objectives of the program area are to document the fundamental biological changes that take place in plants in response to increased ultraviolet radiation and to elucidate underlying mechanisms for the observed changes. Examples include: (a) the genetics of UV-B resistance in plants, (b) the effects of UV-B DNA structure and function (c) structure and function of cellular and sub-cellular membrane systems, (d) photosynthesis, (e) photomorphogenesis, (f) perception and response mechanisms for environmental signals, and (g) light-controlled interactions of plants with microbes, weeds, and insects.

This program area considers all mechanistic and basic studies at the whole plant, cellular, biochemical and molecular levels.

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona Tucson, AZ 85721 | David W. Mount | 89-37280-4871 8902411 | $150,000 | 09/01/89 08/31/92 | Genetics of UV-B Resistance in Arabidopsis Thaliana |
| University of Arizona Tucson, AZ 85721 | Hans J. Bohnert | 89-37280-4913 8902400 | $150,000 | 09/01/89 08/31/92 | Modeling Effects of UV-B Irradiation : Plant Protection by Gene Transfer |
| USDA/ARS Pac. West Area Albany, CA 94710 | Michael E. Fromm | 89-37280-4898 8900490 | $80,000 | 09/01/89 08/31/90 | Molecular Analysis of the Regulation of the Maize Anthocyanin Genes |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Berkeley, CA 94720 | Peter H. Quail | 89-37280-4800 8900464 | $200,000 | 09/01/89 08/31/92 | The Phytochrome Gene Structure, Organization and Expression |
| University of California Davis, CA 95616 | Donald A. Phillips | 89-37280-4697 8901281 | $160,000 | 09/01/89 08/31/91 | The Production of nod-Inducing Flavonoids by Alfalfa |
| Stanford University Stanford, CA 94305 | Virginia Walbot | 89-37280-4840 8902407 | $310,000 | 09/01/89 08/31/92 | Impact of Ultraviolet Light on Maize |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Carnegie Institution of Washington<br>Washington, DC 20005 | Olle D. Bjorkman | 89-37280-4902<br>8901286 | $100,000 | 09/01/89<br>08/31/91 | Mechanisms of Excess Energy Dissipation in Higher Plants |
| University of Florida<br>Gainesville, FL 32611 | Robert H. Biggs | 89-37280-4241<br>8901024 | $5,000 | 02/01/89<br>09/30/89 | A Workshop: The Effects of UV-B Radiation on Crop Productivity |
| University of Illinois<br>Champaign, IL 61820 | Evan H. DeLucia | 89-37280-4817<br>8902435 | $180,000 | 09/15/89<br>09/30/92 | Effects of UV-B Radiation on Foliage Optical Properties and Photosynthesis in Conifers |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Illinois Urbana, IL 61801 | May R. Berenbaum | 89-37280-4897 8901006 | $200,000 | 09/01/89 08/31/92 | Effects of Ozone Loss on Citrus and its Associated Herbivores and Pathogens |
| University of Illinois Urbana, IL 61801 | Antony R. Crofts | 89-37280-4900 8902434 | $100,000 | 09/15/89 09/30/91 | Mechanism of UV Photoinhibition: Studies in Vitro and in Intact Plants |
| Purdue Research Fdn. West Lafayette, IN 47907 | David W. Krogmann | 89-37280-4819 8900767 | $135,000 | 09/15/89 09/30/92 | Carotenoid Protection of Plants from Photodamage |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Richard A. Dilley | 89-37280-4845<br>8900896 | $147,600 | 09/01/89<br>08/31/92 | On How Ultraviolet B Light Damages Photosynthetic Membranes |
| Amherst College<br>Amherst, MA 01002 | David M. Dooley | 89-37280-4696<br>8902260 | $100,000 | 09/01/89<br>08/31/91 | Active Site Structure and Function of Copper Enzymes in Denitrification |
| USDA/ARS Beltsville Area<br>Beltsville, MD 20705 | Steven J. Britz | 89-37280-4799<br>8902402 | $150,000 | 09/01/89<br>08/31/92 | UV-B Radiation Damage in Crop Plants: Photoprotection Photoreversal Mechanisms |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS Beltsville Area<br>Beltsville, MD 20705 | Charles R. Caldwell | 89-37280-4903<br>8902415 | $150,000 | 09/01/89<br>08/31/92 | Biochemical and Biophysical Effects of Ultraviolet-B Radiation on Plant Plasma Membranes |
| University of Maryland<br>College Park, MD 20742 | Alan H. Teramura | 89-37280-4744<br>8902442 | $200,000 | 09/01/89<br>08/31/92 | Genetic Variability and Inheritance of UV-B Tolerance in Soybean |
| University of Maryland<br>College Park, MD 20742 | John C. Watson | 89-37280-4818<br>8901058 | $200,000 | 09/01/89<br>08/31/92 | Photoreceptor Interaction in Light Regulated Gene Expression |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | Andre T. Jagendorf | 89-37280-4870<br>8902395 | $150,000 | 09/15/89<br>09/30/92 | Ozone Depletion Effects on Chloroplast Biogenesis |
| U.S. Dept. of Energy,<br>Brookhaven Area Office<br>Upton, NY 11973 | John C. Sutherland | 89-37280-4798<br>8901529 | $250,000 | 09/01/89<br>08/31/92 | UV-induced Damage to DNA in Crop Plants: Effects of Ozone Depletion |
| Utah State University<br>Logan, UT 84322 | Martyn M. Caldwell | 89-37280-4901<br>8902462 | $261,050 | 09/15/89<br>09/30/92 | Enhanced UV-B: Ecological Effects of Altered Secondary Chemistry and Morphology |

Competitive Research Grants Program
Stratospheric Ozone Depletion

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Brigham Young University<br>Provo, UT 84602 | Rex G. Cates | 89-37280-4899<br>8902641 | $128,950 | 09/15/89<br>09/30/92 | Enhanced UV-B: Ecological Effects of Altered Secondary Chemistry and Morphology |

TOTAL : $ 3,507,600

## BIOTECHNOLOGY

It is widely acknowledged that biotechnological research offers direct access to new, potentially valuable high technology opportunities for agriculture and food production. Recent discoveries in molecular genetics and their successful applications show that "high technology in biology" is applicable to agriculture, and they contribute significantly to "the molecular revolution" that is basic to many of our industries. The new biotechnological research capabilities -- particularly those that build on advances in molecular biology -- have particular advantages for agriculture. They provide a new basis for changing plant and animal productivity and performance on the basis of the directed modification of specified genes and gene systems.

This new capability offers exceptional promise, but it cannot be effective unless it is closely integrated with basic science disciplines such as genetics, biochemistry, physiology, taxonomy, ecology, and key agriculture disciplines such as plant and animal breeding, agronomy, horticulture, plant pathology, and entomology. In recognizing these needs, the overall goal of the Biotechnology Program is to support research aimed at establishing a thorough understanding of fundamental biological processes in animals, plants, and associated microorganisms that may provide the basic scientific knowledge needed for the development and application of the new biotechnological research capability to agriculture and food.

Three research areas are emphasized: (1) molecular genetics (2) molecular and cellular mechanisms of growth and development, and (3) molecular and cellular mechanisms controlling responses to environmental and biological stress.

## BIOTECHNOLOGY - PLANT MOLECULAR BIOLOGY

The primary objective of the sub-area, plant molecular biology, is to increase our understanding of the structure, function, regulation, and expression of genes of plants. This program area emphasizes the following categories of research: (1) identification, isolation, and characterization of genes and gene products, (2) relationships between gene structure and function, (3) regulatory mechanisms of gene expression, (4) interactions between nuclear and organellar genes, and between extrachromosomal and chromosomal genes, (5) mechanisms of gene recombination and transposition, and (6) molecular basis of chromosomal replication.

The proposals under the Biotechnology/Plant Molecular Biology area were submitted to one of the three plant science review panels according to the biological problem being addressed.

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | Kjell Andersen | 88-37262-3385<br>8902545 | $65,000 | 06/01/88<br>05/31/90 | Protein Engineering of A. eutrophus RuBP Carboxylase |
| University of California<br>Irvine, CA 92717 | R. Michael Mulligan | 89-37262-4809<br>8900372 | $120,000 | 08/15/89<br>08/31/91 | Regulation of Transcription in Plant Mitochondria |
| University of California<br>Los Angeles, CA 90024 | Robert B. Goldberg | 89-37262-4524<br>8900376 | $100,000 | 07/01/89<br>06/30/90 | Regulation of Soybean Seed Protein Gene Expression |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Riverside, CA 92521 | Linda L. Walling | 89-37262-4926 8900826 | $100,000 | 09/01/89 08/31/91 | Plastid Development in Chlorophyllous Embryos |
| Stanford University Stanford, CA 94305 | Sharon R. Long | 88-37262-3978 8902631 | $90,000 | 07/15/88 07/31/90 | DNA Replication in Rhizobium meliloti |
| E.I. du Pont de Nemours Co., Inc. Wilmington, DE 19880-0328 | Bruce A. Diner | 89-37262-4794 8900507 | $100,000 | 09/01/89 08/31/91 | Isolation and Biophysical Characterization of Site-directed Mutants of Photosystem II |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Florida Gainesville, FL 32611 | Christine D. Chase | 89-37262-4827 8900543 | $100,000 | 09/01/89 08/31/91 | Molecular Genetics of Cytoplasmic Male Sterility in Phaseolus Vulgaris |
| University of Florida Gainesville, FL 32611 | Robert R. Schmidt | 89-37262-4843 8902239 | $90,000 | 09/01/89 08/31/91 | Nuclear Gene Encoding Two NH3 - Inducible Chloroplastic Isoenzymes |
| University of Georgia Research Foundation, Inc. Athens, GA 30602 | Gregory W. Schmidt | 89-37262-4715 8900979 | $50,000 | 08/01/89 07/31/90 | Pigment Binding of Light-Harvesting Complexes |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS South Atlantic Area<br>Athens, GA 30613 | Daryl R. Pring | 89-37262-4810<br>8900526 | $150,000 | 09/01/89<br>08/31/92 | Nuclear Regulation of Expression of the Sorghum Biocolor Mitochondrial Genome |
| USDA/ARS Mid-West Area<br>Peoria, IL 61604 | Edward H. Coe | 89-37262-4795<br>8902646 | $15,000 | 09/01/89<br>08/31/90 | Definition and Manipulation of Chromosome Segments in Corn |
| University of Illinois<br>Urbana, IL 61801 | Colin A. Wraight | 89-37262-4462<br>8900726 | $50,000 | 06/15/89<br>06/30/90 | Molecular Biochemistry of Herbicide Resistance |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Jeffrey L. Bennetzen | 89-37262-4362<br>8900620 | $210,000 | 08/15/89<br>08/31/92 | Regulation and Specificity of the Mutator Transposable Element System of Maize |
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Stanton B. Gelvin | 89-37262-4643<br>8900628 | $120,000 | 09/15/89<br>09/30/91 | Characterization of a Plant Inducible Gene in Agrobacterium |
| Kansas State University<br>Manhattan, KS 66506 | Lawrence C. Davis | 89-37262-4687<br>8902197 | $90,000 | 08/15/89<br>08/31/91 | Mutations Affecting the Fe Protein of Klebsiella Pneumonaie Nitrogenase |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Kansas State University<br>Manhattan, KS 66506 | Charlie Hedgcoth | 89-37262-4912<br>8900635 | $100,000 | 09/01/89<br>08/31/91 | Wheat Mitochondrial DNA and Cytoplasmic Male Sterility |
| University of Kentucky Research Foundation<br>Lexington, KY 40506-0057 | Robert L. Houtz | 89-37262-4482<br>8900795 | $100,000 | 07/01/89<br>06/30/91 | Post-Translational Modifications in Ribulose Bisphosphate Carboxylase/ Oxygenase |
| University of Kentucky Research Foundation<br>Lexington, KY 40506-0057 | Arthur G. Hunt | 89-37262-4835<br>8900595 | $150,000 | 09/01/89<br>08/31/92 | In Vitro and In Vivo Studies on mRNA 3′ End Formation in Plants |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Louisiana State University and A&M College Baton Rouge, LA 70893-0905 | Terry M. Bricker | 89-37262-4688 8900713 | $100,000 | 09/01/89 08/31/91 | Mutagenesis in the Extrinsic Loop Region of the CPal Apoprotein of Synechocystis |
| USDA/ARS Beltsville Area Beltsville, MD 20705 | Mark L. Tucker | 89-37262-4705 8900650 | $100,000 | 08/01/89 07/31/91 | Hormonal and Cell Specific Regulation of Bean Cellulase Gene Expression |
| University of Minnesota St. Paul, MN 55104 | Burle G. Gengenbach | 89-37262-4360 8900468 | $150,000 | 07/01/89 06/30/92 | Molecular Genetics of Enzymes Regulating Lysine Biosynthesis in Corn |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Washington University St. Louis, MO 63130 | John C. Rogers | 89-37262-4619 8900508 | $60,000 | 08/01/89 07/31/90 | Expression of Foreign Genes in Barley Aleurone Cells |
| University of North Carolina at Chapel Hill Chapel Hill, NC 27599-4100 | Ralph S. Quatrano | 89-37262-4456 8900815 | $210,000 | 05/15/89 05/31/92 | Control of Gene Expression by Abscisic Acid |
| University of Nebraska Lincoln, NE 68583-0704 | Robert J. Spreitzer | 89-37262-4457 8900396 | $84,000 | 06/01/89 05/31/90 | Chloroplast Heteroplasmic Suppression |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| State University of New York* Buffalo, NY 14260 | James O. Berry | 89-37262-4893* 8900802 | $82,750* | 09/01/89 08/31/91 | Molecular Biology of C4 Photosynthesis in Grain Amaranth |
| Cornell University Ithaca, NY 14853 | Maureen R. Hanson | 87-CRCR-1-2277 8902649 | $84,760 | 09/01/87 08/31/90 | Analysis of Proteins Associated with Cytoplasmic Male Sterility |
| Cornell University Ithaca, NY 14853 | Elizabeth D. Earle | 89-37262-4387 8900410 | $130,000 | 09/01/89 08/31/91 | Analysis of Organelles from Somatic Hybrids and Cybrids of cms and Fertile Brassica |

*Grant split-funded with Plant Science-Photosynthesis area. Total amount awarded $100,000.

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | June B. Nasrallah | 89-37262-4458<br>8900720 | $85,000 | 09/01/89<br>08/31/90 | Molecular Analysis of the Cellular Interactions of Incompatibility in Brassica |
| Boyce Thompson Institute for Plant Research<br>Ithaca, NY 14853 | Thomas A. LaRue | 89-37262-4739<br>8901598 | $45,000 | 09/01/89<br>08/31/90 | Analysis and Cloning of Symbiosis Genes in Pisum Sativum |
| Rensselaer Polytechnic Institute<br>Troy, NY 12180-3590 | Harry Roy | 89-37262-4689<br>8900330 | $125,000 | 08/01/89<br>07/31/91 | Assembly of Ribulose Bisphosphate Carboxylase |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| U.S. Dept. of Energy, Brookhaven Area Office Upton, NY 11973 | Geoffrey Hind | 89-37262-4544 8900656 | $100,000 | 09/01/89 08/31/91 | Reversible Phosphorylation of Thylakoid Membrane Proteins |
| Ohio State University Research Foundation Columbus, OH 43212 | David M. Bisaro | 87-CRCR-1-2541 8902571 | $85,400 | 09/01/87 08/31/90 | Molecular Mechanisms of Geminivirus Replication |
| Ohio State University Research Foundation Columbus, OH 43212 | Fred R. Tabita | 89-37262-4566 8900810 | $100,000 | 09/01/89 08/31/91 | Bacterial Genes Coding for Plant Ribulose Bisphosphate Carboxylase |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Ohio State University Research Foundation Columbus, OH 43212 | Thomas L. Sims | 89-37262-4844 8900665 | $50,000 | 09/01/89 08/31/90 | Self-incompatibility in Petunia: Regulation of S-Locus Gene Expression |
| Drexel University Philadelphia, PA 19104 | Michael S. Dobres | 89-37262-4793 8900388 | $100,000 | 09/01/89 08/31/91 | Growth Synchronized Gene Expression in Pisum sativum |
| Gordon Res. Conference* Kingston, RI 02881 | Eugene J. Eisen | 89-37262-4215* 8900311 | $2,500* | 12/15/88 06/30/89 | Gordon Conference on Quantitative Genetics and Biotechnology |

*Grant split-funded with Biotechnology-Animal Molecular Biology area. Total amount awarded $5,000.

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Texas Health Science Center Houston, TX 78712 | Samuel Kaplan | 89-37262-4939 8902674 | $75,000 | 09/15/89 09/30/90 | Synthetic Deoxyoligonucleotide-Directed Analysis of Gene Control in Photosynthesis |
| University of Utah Salt Lake City, UT 84112 | D. R. Wolstenholme | 89-37262-4341 8900674 | $120,000 | 06/01/89 05/31/91 | A Plant Mitochondrial Maturase Gene |
| Washington State University Pullman, WA 99164-5045 | Andris Kleinhofs | 89-37262-4363 8900521 | $50,000 | 07/01/89 06/30/90 | Mutation Analysis of Nitrate Reductase Structure, Function and Regulation |

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Washington State University Pullman, WA 99164-5045 | John A. Browse | 89-37262-4388 8900513 | $150,000 | 07/01/89 06/30/92 | Genetic and Molecular Approaches to Modifying the Composition of Seed Oils |
| Washington State University* Pullman, WA 99164-5045 | Gynheung An | 89-37262-4892* 8900530 | $127,008* | 09/15/89 09/30/91 | Molecular Mechanisms Controlling Wound-Inducible Gene Expression |
| University of Wisconsin Madison, WI 53706 | Richard D. Vierstra | 88-37262-3368 8902564 | $80,000 | 07/01/88 06/30/90 | Characterization of the Ubiquitin-Dependent Proteolytic Pathway in Plants |

*Grant split-funded with Plant Science-Genetic Mechanisms area. Total amount awarded $130,008.

Competitive Research Grants Program
Biotechnology - Plant Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin Madison, WI 53706 | Gary P. Roberts | 89-37262-4740 8902142 | $100,000 | 09/01/89 08/31/91 | Analysis of Post-translational Regulatory System for Nitrogenase in R. rubrum |
| University of Wisconsin* Madison, WI 53706 | Jo Handelsman | 89-37262-4746* 8902207 | $53,851* | 09/01/89 08/31/91 | Identification of Competitiveness Genes in Rhizobium leguminosarum bv. phaseoli |
| University of Wisconsin Madison, WI 53706 | Eric W. Triplett | 89-37262-4792 8902190 | $98,899 | 09/01/89 08/31/91 | The Anti-rhizobial Peptide Trifolitoxin: Genetics, Structure, and Mode of Action |

TOTAL : $ 4,349,168

*Grant split-funded with Plant Science-Nitrogen Fixation Metabolism area. Total amount awarded $90,000.

## BIOTECHNOLOGY - RESPONSE TO BIOLOGICAL STRESS (Plants)

The primary objective of the sub-area is to increase our understanding of the structure, function regulation, expression, and inheritance of genes of plant pathogens, weeds, insects, mites, nematodes and their associated microorganisms and control agents. The program area emphasizes, but is not restricted to: 1) identification and characterization of genes and gene products, 2) relationship between gene structure and function, 3) regulation of gene expression, 4) mechanisms of gene recombination, 5) molecular basis of chromosomal replication, and 6) genetic mechanisms of interactions between beneficial and deleterious organisms and plant pathogen/weed/invertebrate (includes microorganisms).

The proposals under the Biotechnology/Response to Biological Stress on Plants area were reviewed by either the Plant Pathology/Weed Science panel or the Entomology/Nematology panel, depending on the biological problem being addressed in the proposal.

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Tuskegee University* Tuskegee, AL 36088 | C. S. Prakash | 89-37263-4813* 8900679 | $84,750* | 09/01/89 08/31/89 | Somaclonal Variation for Disease Resistance and Genome Modification |
| University of Arkansas** Fayetteville, AR 72701 | Rose C. Gergerich | S89-37263-4559* 8900965 | $3,750** | 09/01/89 08/31/91 | Plant Virus Interactions with Beetle Vectors and Plants During Transmission |
| University of California Berkeley, CA 94720 | Loy E. Volkman | 87-CRCR-1-2416 8902635 | $50,000 | 08/15/87 08/31/90 | Role of Microfilaments in Autographa californica NPV Assembly |

*Grant split-funded with Biological Stress-Plant Pathology/Weed Science area. Total amount awarded $100,000.

**Grant split-funded with Biological Stress-Entomology/Nematology area where actual count is included. Total amount awarded $100,000.

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Berkeley, CA 94720 | Andrew O. Jackson | 88-37263-3989 8902539 | $60,000 | 09/01/88 08/31/90 | Molecular Analysis of Barley Stripe Mosaic Virus Structure and Pathology |
| University of California Berkeley, CA 94720 | Loy E. Volkman | 89-37263-4494 8900877 | $50,000 | 09/01/89 08/31/90 | Baculovirus Virulence in Insects |
| University of California Berkeley, CA 94720 | Thomas J. Morris | 89-37263-4691 8900445 | $75,000 | 09/01/89 08/31/90 | Molecular Structure and Function of Carmovirus Genomes |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | Bruce D. Hammock | 88-37234-4006 8902653 | $50,000 | 09/01/88 08/31/90 | Affinity Purified JH Esterase and Its Gene for Bollworm Control |
| University of California Davis, CA 95616 | R. W. Michelmore | 89-37263-4646 8900484 | $60,000 | 08/01/89 07/31/91 | Cloning of Avirulence Genes from Bremia Lactucae |
| University of California Davis, CA 95616 | Brett M. Tyler | 89-37263-4647 8900518 | $102,400 | 08/01/89 07/31/91 | Molecular and Genetic Analysis of Phytophthora megasperma Infection of Soybean |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | George Bruening | 89-37263-4867<br>8900612 | $150,000 | 09/01/89<br>08/31/92 | Antiviral Action of Satellite RNA |
| University of California<br>Riverside, CA 92521 | David M. Bird | 89-37263-4355<br>8900831 | $60,000 | 07/01/89<br>06/30/90 | Molecular Characterization of the Root-Knot Nematode Host Interaction |
| University of California<br>Riverside, CA 92521 | William O. Dawson | 89-37263-4534<br>8900363 | $75,000 | 07/01/89<br>06/30/90 | Sequence-Function Relationship of the TMV-Host Interaction |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Riverside, CA 92521 | Frances Jurnak | 89-37263-4644 8900710 | $80,000 | 08/01/89 01/31/91 | Structural Characterization of a Plant Pathogen: Pectate Lyase |
| Salk Institute for Biological Studies San Diego, CA 92138 | Christopher J. Lamb | 89-37263-4690 8900737 | $90,000 | 07/01/89 06/30/91 | Gene Activation Mechanisms in the Initiation of Plant Defense Responses |
| University of Florida Gainesville, FL 32611 | Harlan G. Hall | 89-37263-4427 8900956 | $120,000 | 08/01/89 07/31/91 | African Honeybee Migration Followed with DNA Markers |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Iowa State University of Science and Technology Ames, IA 50011 | Robert E. Andrews | 89-37263-4349 8900985 | $160,000 | 06/01/89 05/31/92 | Tn916 Mediated Transfer of Genetic Information in Bacillis Thuringiensis |
| Iowa State University of Science and Technology Ames, IA 50011 | W. Allen Miller | 89-37263-4645 8900627 | $100,000 | 09/15/89 09/30/91 | Gene Expression Strategies of Barley Yellow Dwarf Virus |
| University of Illinois Urbana, IL 61801 | Stephen K. Farrand | 89-37263-4754 8900457 | $90,000 | 09/15/89 09/30/91 | Control of Crown Gall: Plasmid Engineering |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Kansas State University<br>Manhattan, KS 66506 | Robin E. Denell | 89-37263-4351<br>8901004 | $150,000 | 06/01/89<br>05/31/92 | Transposon-mediated Molecular Cloning and Germline Transformation in Beetles |
| University of Kentucky Research Foundation<br>Lexington, KY 40506-0057 | Thomas P. Pirone | 89-37263-4593<br>8900528 | $80,000 | 07/01/89<br>06/30/91 | The Molecular Basis for Potyvirus Helper Component Activity |
| University of Minnesota<br>St. Paul, MN 55104 | Ann M. Fallon | 88-37263-4020<br>8902590 | $50,000 | 09/15/88<br>09/30/90 | Application of DNA mediated Gene Transfer to Studies on Insecticide Resistance |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Missouri<br>Columbia, MO 65211 | James E. Schoelz | 89-37263-4812<br>8900336 | $80,000 | 09/01/89<br>08/31/91 | Host Specificity of Cauliflower Mosaic Virus |
| North Carolina State University<br>Raleigh, NC 27695-7003 | Peter B. Lindgren | 89-37263-4737<br>8900499 | $80,000 | 09/01/89<br>08/31/91 | Molecular Genetic Analysis of the Hypersensitive Reaction |
| University of Nevada<br>Reno, NV 89557-0025 | Gary J. Blomquist | 89-37263-4473<br>8900879 | $100,000 | 07/01/89<br>06/30/91 | Biosynthesis of Insect Cuticular Lipids - Potential for Insect Control |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Research Foundation of State University of New York Albany, NY 12201 | Jeremy A. Bruenn | 89-37263-4716 8900352 | $90,000 | 09/01/89 08/31/91 | Cloning and Expression of Ustilago maydis Virus Toxin Genes |
| Cornell University Ithaca, NY 14853 | Hans D. VanEtten | 87-CRCR-1-2510 8902538 | $58,100 | 08/01/87 07/31/90 | Do Pathogens of the Same Host Require Common Pathogenicity Traits? |
| Cornell University Ithaca, NY 14853 | O. C. Yoder | 87-CRCR-1-2557 8902592 | $50,000 | 09/15/87 09/30/90 | Molecular Analysis of the Tox 1 Gene of Cochliobolus Heterostrophus |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University Ithaca, NY 14853 | O. C. Yoder | 88-37263-3544 8902593 | $50,000 | 07/01/88 06/30/90 | Altered Virulence and Specificity in Recombinant Fungal Pathogens |
| Boyce Thompson Institute for Plant Research Ithaca, NY 14853 | Stephen H. Howell | 88-37263-4137 8902652 | $40,000 | 09/01/88 08/31/90 | Viral Pathogenesis in Plants |
| Cornell University Ithaca, NY 14853 | Douglas C. Knipple | 89-37263-4425 8900832 | $160,000 | 06/01/89 05/31/92 | Molecular Genetics of the kdr Resistance Mechanism |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Boyce Thompson Institute for Plant Research Ithaca, NY 14853 | Donald W. Roberts | 89-37263-4463 8900911 | $60,000 | 07/01/89 06/30/90 | Genes for Cuticle Penetration Enzymes of an Entomopathogenic Fungus |
| Cornell University Ithaca, NY 14853 | Steven V. Beer | 89-37263-4692 8900678 | $100,000 | 08/01/89 07/31/91 | Genes of Erwinia amylovora Involved in Pathogenicity and Plant Defense |
| Cornell University Ithaca, NY 14853 | Steven D. Tanksley | 89-37263-4828 8900415 | $100,000 | 09/01/89 08/31/91 | Cloning Plant Genes for Disease |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University* Ithaca, NY 14853 | William E. Fry | S89-37151-4477* 8902663 | $75,000* | 07/01/89 06/30/91 | Population Genetics of Phytophthora infestans |
| Ohio State University Research Foundation Columbus, OH 43212 | Robert C. Garber | 89-37263-4811 8900467 | $90,000 | 08/15/89 08/31/91 | Molecular Biology of Mating Type and Pathogenicity |
| Oregon State University Corvallis, OR 97331 | Rene Feyereisen | 89-37263-4495 8900923 | $150,000 | 07/01/89 06/30/92 | Induction of P450 Genes by Plant Chemicals in Manduca sexta |

*Grant split-funded with Biological Stress-Plant Pathology/Weed Science area where actual count is included. Total amount awarded $75.000.

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oregon State University<br>Corvallis, OR 97331 | Theo W. Dreher | 89-37263-4796<br>8900450 | $55,000 | 09/01/89<br>08/31/90 | Studies on a Virus Encoded Subunit of Plant Viral Replicase |
| Pennsylvania State University<br>University Park, PA 16802 | C. A. Mullin | 89-37263-4567<br>8900921 | $74,000 | 08/01/89<br>07/31/91 | Molecular Adaptations in Herbivorous Insects to Epoxide Toxicities |
| Texas A&M Research Foundation<br>College Station, TX 77843 | James C. Carrington | 89-37263-4503<br>8900659 | $90,000 | 08/01/89<br>07/31/91 | Processing and Mutagenesis of HC Pro, A Second Potyvirus Proteinase |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Utah State University Logan, UT 84322 | Neal K. Van Alfen | 89-37263-4504 8900649 | $40,000 | 08/01/89 07/31/90 | RNA Polymerase Associated with the dsRNA of Cryphonectria Parasitica |
| University of Vermont Burlington, VT 05405 | George M. Happ | 87-CRCR-1-2406 8902581 | $50,000 | 08/01/87 07/31/90 | Control of Reproduction in Male Insects |
| University of Washington Seattle, WA 98195 | Lynn M. Riddiford | 89-37263-4350 8900924 | $100,000 | 06/01/89 05/31/91 | Melanization: A Molecular Model for Ecdysone and Juvenile Hormone Action |

Competitive Research Grants Program
Biotechnology - Response to Biological Stress

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Washington* Seattle, WA 98195 | Peter M. Kareiva | S89-37151-4650* 8902670 | $27,500* | 07/01/89 06/30/92 | Experimental and Theoretical Studies of the Spatial Spread of Genes through Weeds |
| University of Wisconsin Madison, WI 53706 | Michael R. Strand | 89-37263-4426 8900998 | $60,000 | 07/01/89 06/30/90 | The Role of Host Endocrine Factors in the Development of Polyembryonic Parasitoids |
| University of Wyoming Laramie, WY 82071 | Mark M. Stayton | 89-37263-4594 8900556 | $80,000 | 08/01/89 07/31/91 | Plant Pathogen Communication: The Biochemical Basis for Avirulence Gene Function |

TOTAL : $ 3,600,500

*Grant split-funded with Biological Stress-Plant Pathology/Weed Science area. Total amount awarded $27,500.

## BIOTECHNOLOGY - RESPONSE TO PHYSICAL STRESS (Plants)

This program supports research on the various physico-chemical factors (such as heat, cold, drought, etc.) which prevent the expression of the full genetic potential of a plant. The major goals are to understand the molecular basis for the response to the various stresses and to identify which genetic systems causing these responses can be manipulated by biotechnology techniques.

The program emphasizes: the identification, transfer, and expression of genes involved in the stress response or are likely to affect performance under stress; fundamental mechanisms of the stress response including injury, tolerance and avoidance of stress at the molecular, cellular, and organismal level; mechanisms of the coordination of organismal response to stress; and laboratory and field investigations leading to an understanding of the causes, consequences, and avoidance of stress.

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | Hans J. Bohnert | 89-37264-4711<br>8901266 | $50,000 | 09/01/89<br>08/31/90 | Regulation of Gene Expression During Salt Stress |
| An Individual Award<br>Berkeley, CA 94707 | J. N. Bailey-Serres | 89-37264-4837<br>8901353 | $33,000 | 09/01/89<br>08/31/90 | Translational Regulation of the Anaerobic Stress Response of Maize Seedling Roots |
| University of California<br>Davis, CA 95616 | Kent J. Bradford | 89-37264-4797<br>8901320 | $120,000 | 09/01/89<br>08/31/92 | Wild Rice: A System for Studying Desiccation Tolerance Mechanisms in Seeds |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California<br>Los Angeles, CA 90024-1406 | Eduardo Zeiger | 89-37264-4616<br>8902616 | $50,000 | 08/01/89<br>07/31/90 | Stomatal Control in Agricultural Crops |
| University of California<br>Riverside, CA 92521 | Justin K. Roberts | 89-37264-4933<br>8901340 | $100,000 | 09/01/89<br>08/31/92 | The Role of Nucleotide-Protein Interactions in the Energy Metabolism of Corn |
| University of Florida<br>Gainesville, FL 32611 | Charles L. Guy | 88-37264-4024<br>8902556 | $50,000 | 09/01/88<br>08/31/90 | Low Temperature Regulated Genes Associated with Freezing Tolerance in Spinach |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Florida<br>Gainesville, FL 32611 | Carlos E. Vallejos | 89-37264-4745<br>8901378 | $100,000 | 08/15/89<br>08/31/92 | Molecular and Genetic Analysis of Low Temperature Tolerance in Tomato |
| University of Florida<br>Gainesville, FL 32611 | Leo G. Albrigo | 89-37264-4752<br>8901380 | $50,000 | 09/15/89<br>09/30/90 | Cellular and Whole Plant Complexation and Transport of Zinc and Copper |
| USDA/ARS Mid-West Area<br>Peoria, IL 61604 | Mark E. Westgate | 89-37264-4934<br>8901669 | $100,000 | 09/15/89<br>09/30/91 | Physiological Basis for the Effects of Water Deficits on Plant Reproduction |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Maine<br>Orono, ME 04469 | Michael E. Vayda | 89-37264-4868<br>8901289 | $120,000 | 09/01/89<br>08/31/91 | Molecular Responses of Potato Tubers to Wounding and Hypoxic Stress |
| Michigan State University<br>East Lansing, MI 48824 | Andrew D. Hanson | 87-CRCR-1-2460<br>8902499 | $79,000 | 09/15/87<br>09/30/90 | Molecular Basis and Function of Stress induced Betaine Synthesis in Plants |
| Michigan State University<br>East Lansing, MI 48824 | C. R. Somerville | 89-37264-4838<br>8901337 | $90,000 | 09/01/89<br>08/31/91 | The Role of Lipid Unsaturation in Cold Sensitivity |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Nebraska Lincoln, NE 68588-0430 | Philip M. Kelley | 89-37264-4816 8901341 | $69,638 | 09/01/89 08/31/90 | The Regulation of the Anaerobic Genes of Maize |
| Cornell University Ithaca, NY 14853 | John C. Steffens | 88-37264-3794 8902622 | $50,000 | 08/01/88 07/31/90 | Biochemical and Molecular Basis of Heavy Metal Resistance in Tomato |
| Cornell University Ithaca, NY 14853 | Tim L. Setter | 89-37264-4942 8901064 | $40,000 | 09/01/89 08/31/90 | Mechanisms by Which Water Stress Alters Cell Division In Developing Maize Endosperm |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| City Univ. of New York Res. Fdn. & College of Staten Island Staten Island, NY 10301 | Ruth E. Stark | 89-37264-4710 8900474 | $65,000 | 09/15/89 09/30/91 | Molecular Structure of Plant Cuticle Polyesters |
| Ohio State University Research Foundation Columbus, OH 43212 | Brian A. McBlain | 89-37264-4836 8901374 | $48,000 | 09/01/89 08/31/90 | Role of C and N Partitioning in Tolerance to Moisture Stress in Soybean |
| Oklahoma State University Stillwater, OK 74078 | Arnon Rikin | 89-37264-4814 8901284 | $70,000 | 09/01/89 08/31/91 | The Role of Microtubules in Chill-Acclimation of Plants |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oregon State University Corvallis, OR 97331 | Tony H. Chen | 88-37264-3949 8902611 | $50,000 | 09/15/88 09/30/90 | Expression of a Bacterial Ice Nucleation Protein Gene in Plants |
| Oregon State University Corvallis, OR 97331 | Patrick M. Hayes | 89-37264-4756 8901507 | $120,000 | 08/15/89 08/31/92 | Genetic Analysis of Cold Tolerance in Water Barley |
| Oregon State University Corvallis, OR 97331 | Leslie H. Fuchigami | 89-37264-4815 8901512 | $80,157 | 09/15/89 09/30/92 | Characterization of the Ice Nucleation Barrier in Supercooling Buds |

Competitive Research Grants Program
Biotechnology - Response to Physical Stress (Plants)

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Texas Tech University<br>Lubbock, TX 79409 | Henry T. Nguyen | 89-37264-4829<br>8901551 | $135,205 | 09/01/89<br>08/31/92 | Role of Heat Shock Proteins in Heritable Thermal Tolerance in Wheat |
| Washington State University<br>Pullman, WA 99164-5045 | Clarence A. Ryan | 89-37264-4758<br>8901305 | $105,000 | 09/01/89<br>08/31/91 | Wound-Inducible Alfalfa Trypsin Inhibitor (ATI) Gene |

TOTAL : $ 1,775,000

## BIOTECHNOLOGY - PLANT GROWTH AND DEVELOPMENT

The lack of information about the basic cellular and molecular processes involved in plant growth and development is considered a serious limiting step for realizing the full potential of biotechnology in agriculture. The goal of this program is to support fundamental research designed to fill in this gap in our knowledge. The program encourages the use of emerging experimental techniques and emphasizes: (1) cellular and molecular mechanisms controlling plant growth and development and (2) metabolic processes related to growth and development.

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | Brian A. Larkins | 89-37261-4790<br>8902640 | $98,000 | 09/01/89<br>08/31/90 | Analysis of Seed Globulin Gene Expression in Oats and Other Cereals |
| University of California<br>Berkeley, CA 94720 | W. Zacheus Cande | 89-37261-4472<br>8901117 | $200,000 | 08/01/89<br>07/31/92 | Genetics and Cell Biology of Microtubule Function During Microsporogenesis |
| University of California<br>Berkeley, CA 94720 | Robert L. Fischer | 89-37261-4642<br>8901115 | $102,688 | 08/01/89<br>07/31/91 | Function of Cell Wall Hydrolases During Transgenic Tomato Fruit Ripening |

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | J. Clark Lagarias | 89-37261-4541 8901162 | $100,000 | 07/01/89 06/30/90 | Phytochrome Chromophore Biosynthesis and Holoprotein Assembly |
| University of California Davis, CA 95616 | Alan B. Bennett | 89-37261-4641 8902608 | $97,312 | 08/01/89 07/31/91 | Function of Cell Wall Hydrolases During Transgenic Tomato Fruit Ripening |
| University of California, San Diego La Jolla, CA 92093 | M. J. Chrispeels | 89-37261-4686 8901062 | $60,000 | 09/01/89 08/31/90 | Targeting and Function of a Tonoplast Protein |

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Santa Barbara, CA 93106 | James Cooper | 89-37261-4808 8901061 | $180,000 | 09/01/89 08/31/92 | Molecular Genetic Manipulation of Plant Cell Wall Structure |
| USDA/ARS Northern Plains Area Fort Collins, CO 80526 | James D. Metzger | 89-37261-4708 8901095 | $150,000 | 08/01/89 07/31/92 | Biochemical Mechanisms for Regulating Gibberellin Levels in Thlaspi arvense L |
| University of Florida Gainesville, FL 32611 | Prem S. Chourey | 89-37261-4775 8901172 | $40,000 | 09/01/89 08/31/90 | Developmental Regulation of Sucrose Synthase Genes in Maize |

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Georgia Research Foundation, Inc. Athens, GA 30602 | Russell Malmberg | 88-37261-4030 8901056 | $140,000 | 09/01/88 08/31/91 | Alternative Pathways of Pistil Development in Tobacco and Arabidopsis |
| University of Chicago Chicago, IL 60637 | Laurens J. Mets | 87-CRCR-1-2351 8902648 | $97,000 | 06/15/87 06/30/90 | Genetic Control of Cellular Differentiation in Leaves of a C4 Plant |
| University of Chicago Chicago, IL 60637 | Gayle K. Lamppa | 89-37261-4471 8901129 | $100,000 | 09/01/89 08/31/91 | Acyl Carrier Protein Synthesis and Import into Chloroplasts |

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS Beltsville Area Beltsville, MD 20705 | Jerry D. Cohen | 89-37261-4734 8901173 | $180,000 | 09/15/89 09/30/92 | Developmental Biology of Auxin Containing Peptides |
| USDA/ARS Beltsville Area* Beltsville, MD 20705 | Eliot M. Herman | S89-37231-4460* 8901104 | $69,636* | 07/01/89 06/30/92 | The Ontogeny of Soybean Seed and Leaf Oil Bodies |
| University of Maryland College Park, MD 20742 | Todd J. Cooke | 89-37261-4791 8901168 | $160,000 | 08/01/89 07/31/92 | Using ts Variants to Study Pattern Formation in Carrot Embryogenesis |

*Grant split-funded with the Plant Science-Soybean Research area where actual count is included. Total amount awarded $149,000.

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Michigan<br>Ann Arbor, MI 48109 | Harry C. Winter | 89-37261-4866<br>8901170 | $40,000 | 09/01/89<br>08/31/90 | Leucine Oxidation and 4-Substituted Glutamic Acids in Germinating Legumes |
| Michigan State University<br>East Lansing, MI 48824 | Hans J. Kende | 89-37261-4461<br>8901090 | $131,410 | 09/01/89<br>08/31/91 | Studies of Ethylene Formation Using Mutants and a Photoaffinity Probe |
| University of Minnesota<br>St. Paul, MN 55104 | Wesley P. Hackett | 89-37261-4685<br>8901100 | $94,742 | 09/01/89<br>08/31/91 | Differential Anthocyanin Accumulation in Juvenile and Mature Ivy |

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| *University of Minnesota St. Paul, MN 55104 | Carolyn D. Silflow | 89-37261-4891 8901128 | $220,000 | 09/15/89 09/30/91 | Tubulin Gene Expression during Maize Development |
| *University of Minnesota St. Paul, MN 55104 | Susan M. Wick | 89-37261-4910 8902647 | $150,000 | 09/15/89 09/30/91 | Tubulin Gene Expression during Maize Development |
| University of Missouri Columbia, MO 65211 | William C. Taylor | 89-37261-4911 8901153 | $109,212 | 09/01/89 08/31/91 | Nuclear Genes that Regulate Chloroplast Development |

*Collaborative research project.

Competitive Research Grants Program
Biotechnology - Plant Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| CUNY Research Foundation on Behalf of Baruch College New York, NY 10010 | Edward B. Tucker | 89-37261-4592 8901059 | $180,000 | 08/01/89 07/31/92 | The Diffusive Selectivity of Plasmodesmata |
| Pennsylvania State University University Park, PA 16802 | Richard J. Cyr | 89-37261-4591 8902639 | $200,000 | 08/15/89 08/31/92 | Role of Microtubule Associated Proteins in Plant Growth and Development |

TOTAL : $ 2,900,000

## BIOTECHNOLOGY - PLANT SCIENCE CENTERS

This is a part of the DOE/NSF/USDA Plant Science Centers Program. The program is founded on the need to increase support for basic research in plant science in order to ensure the future competitive position of U.S. agriculture, and on the recognition that some problems in plant science are sufficiently complex that a critical mass of resources and of researchers from several disciplines would be more effective in addressing them than the traditional single investigator research projects. The goal of the program is to encourage the best in basic research in plant science using the multidisciplinary approach. This program was not open to competition for fiscal year 1989.

Competitive Research Grants Program
Biotechnology - Plant Science Centers

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Michigan State University<br>East Lansing, MI 48824 | John B. Ohlrogge | 88-37261-3964*<br>8902607 | $300,000* | 09/15/89<br>09/14/93 | Center for Genetic and Biochemical Alteration of Plant Lipids and Starch |

TOTAL : $ 300,000

*Grant split-funded with Federal Administration. Total amount awarded $500,000.

## BIOTECHNOLOGY - ANIMAL MOLECULAR BIOLOGY

The objective of the animal molecular biology program is to increase our knowledge and understanding of the structure, function, regulation and expression of genomes of animal, microbial and viral origin. This includes but is not limited to: the molecular biology of genes of cellular, organellar or animal origin; gene transfer and germline integration of exogenous genes; the molecular biology of replication and gene expression of bacteria, parasites, viruses and other infectious or non-infectious agents; structural immunology and immunogenetics; molecular genetics; and molecular endocrinology. Priorities are given to those studies that will yield fundamental information which may ultimately aid in improving the biological efficiency and disease resistance in domestic animals.

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona Tucson, AZ 85721 | Lynn A. Joens | 89-37266-4694 8901711 | $220,000 | 08/01/89 07/31/92 | Defining Immunogenic Antigens of Treponema hyodysenteriae using Molecular Biology |
| Stanford University Stanford, CA 94305 | William W. Ruehl | 87-CRCR-1-2403 8902610 | $160,000 | 09/01/87 08/31/90 | Moraxella bovis Pili. Molecular and Genetic Studies |
| University of Florida Gainesville, FL 32611 | E. P. Gibbs | 89-37266-4896 8901586 | $220,000 | 09/15/89 09/30/92 | Development of a Swine-pox-Pseudorabies Recombinant Virus for Oral Vaccination |

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Tampa Bay Research Institute<br>St. Petersburg, FL 33716 | Meihan Nonoyama | 89-37266-4839<br>8901763 | $220,000 | 09/01/89<br>08/31/91 | Study on a Putative Tumor-Inducing Gene of Marek's Disease Virus |
| University of Georgia Research Foundation, Inc.<br>Athens, GA 30602 | Harry W. Dickerson | 89-37266-4649<br>8901698 | $280,000 | 09/01/89<br>08/31/92 | Isolation and Expression of Ichthyophthirius Genes Eliciting Immunity in Fish |
| USDA/ARS Mid-West Area<br>Peoria, IL 61604 | Lucy F. Lee | 89-37266-4869<br>8901646 | $220,000 | 09/15/89<br>09/30/91 | MDV Transformation: Identification of a Viral Gene Resembling Jun Fos |

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Illinois Urbana, IL 61801 | Harris A. Lewin | 89-37266-4568 8901741 | $125,000 | 09/01/89 08/31/90 | Mapping and Polymorphism of Bovine Major Histocompatibility Complex Genes |
| Louisiana State University Medical Center Shreveport, LA 71130 | D. J. O'Callaghan | 89-37266-4735 8901191 | $272,334 | 09/01/89 08/31/92 | Molecular Studies for Development of an Equine Herpesvirus Vaccine |
| Michigan State University East Lansing, MI 48824 | Robert W. Bull | 89-37266-4895 8900884 | $5,000 | 09/15/89 09/30/90 | Conference Grant for the XXIInd International Conference on Animal Genetics |

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Nebraska Lincoln, NE 68588-0430 | John A. Brumbaugh | 89-37266-4717 8901731 | $161,907 | 09/01/89 08/31/91 | Testing of an Easily Monitored Gene Transfer System for Early Chick Embryos |
| Univ. of Pennsylvania Philadelphia, PA 19104 | William C. Lawrence | 89-37266-4693 8901736 | $220,000 | 08/01/89 07/31/92 | Development of Bovine Herpesvirus I as a Vector for Genes of Other Bovine Pathogens |
| USDA/ARS North Atlantic Area Philadelphia, PA 19118 | Daniel L. Rock | 89-37266-4953 8902679 | $192,759 | 09/15/89 09/30/91 | BHV-1 Latency Related Gene: Function in Viral Latency and Reactivation |

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Gordon Res. Conference* Kingston, RI 02881 | Eugene J. Eisen | S89-37262-4215* 8900311 | $2,500* | 12/15/88 06/30/89 | Gordon Conference on Quantitative Genetics and Biotechnology |
| Texas A&M Research Foundation College Station, TX 77843 | Donald L. Jarvis | 89-37266-4935 8901657 | $217,500 | 09/15/89 09/30/92 | Expression and Processing of Foreign Glycoproteins by Recombinant Baculoviruses |
| University of Wisconsin Madison, WI 53706 | G. J. Letchworth | 89-37266-4930 8901665 | $203,000 | 09/15/89 09/30/92 | Persistence of Vesicular Stomatitis Virus New Jersey in Nature |

*Grant split-funded with Biotechnology-Plant Molecular Biology area where the actual count is included. Total amount awarded $5,000.

Competitive Research Grants Program
Biotechnology - Animal Molecular Biology

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Medical College of Wisconsin, Inc. Milwaukee, WI 53226 | Brian D. Halligan | 89-37266-4695 8901645 | $280,000 | 09/01/89 08/31/91 | The Mechanism of Ig Gene Recombination: The Role of NBP |

TOTAL : $ 3,000,000

## BIOTECHNOLOGY - ANIMAL GROWTH AND DEVELOPMENT

Research in animal growth and development contributes to a basic understanding of potential problems related to suboptimal growth and development in animals of domestic agricultural significance. The program emphasizes molecular and cellular biological approaches in a number of research areas including but not limited to: growth hormones, growth factors and other macromolecules which regulate muscle and skeletal growth; the transfer of exogenous genes to the germline of domestic animals and their subsequent expression, mammary gland biogenesis and development; the regulation of gene expression as it relates to developmental processes; and the developmental consequences of embryo transfer. Special attention is given to innovative projects of "high risk."

Competitive Research Grants Program
Biotechnology - Animal Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | Darrel E. Goll | 87-CRCR-1-2283<br>8902613 | $100,000 | 09/01/87<br>08/31/90 | Proteases Responsible for Muscle Protein Degradation and Their Role in Growth |
| University of Arizona<br>Tucson, AZ 85721 | Ronald E. Allen | 89-37265-4474<br>8900387 | $275,000 | 07/01/89<br>06/30/92 | Regulation of Bovine Skeletal Muscle Satellite Cell Activity |
| University of California,<br>San Diego<br>La Jolla, CA 92093 | Lynette B. Corbeil | 89-37265-4648<br>8900550 | $210,000 | 09/01/89<br>08/31/91 | Development of the Bovine IgG2 Response |

Competitive Research Grants Program
Biotechnology - Animal Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Florida Gainesville, FL 32611 | Frank A. Simmen | 89-37265-4545 8902619 | $210,000 | 07/01/89 06/30/92 | Insulin-like Growth Factor-I (IGF-I) in Neonatal Growth and Development |
| Iowa State University of Science and Technology Ames, IA 50011 | Ted W. Huiatt | 89-37265-4441 8900655 | $230,000 | 07/01/89 06/30/92 | Proteins Integrating the Cytoskeleton of Developing and Adult Muscle Cells |
| University of Illinois Urbana, IL 61801 | Keith W. Kelley | 89-37265-4536 8900545 | $100,000 | 09/01/89 08/31/90 | Endocrine Regulation of the Immune System |

Competitive Research Grants Program
Biotechnology - Animal Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University Ithaca, NY 14853 | Dale E. Bauman | 89-37265-4478 8900571 | $237,078 | 07/01/89 06/30/92 | Cellular Mechanisms for the Regulation of Lipid Metabolism |
| Cornell University Ithaca, NY 14853 | William Hansel | 89-37265-4776 8900351 | $5,000 | 06/01/89 11/30/89 | Second Symposium on Genetic Engineering of Animals |
| Temple University School of Medicine Philadelphia, PA 19140 | Edward P. Kirby | 89-37265-4538 8900520 | $230,000 | 07/01/89 06/30/91 | Control of Contact Activation in Cattle |

Competitive Research Grants Program
Biotechnology - Animal Growth & Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Texas Medical Branch Galveston, TX 77550 | David A. Konkel | 89-37265-4535 8900379 | $135,422 | 09/01/89 08/31/91 | The ras Ongogene - related cps/ARF Gene Family -- Structure, Function, Regulation |
| Washington State University Pullman, WA 99164-5045 | William C. Davis | 89-37265-4537 8900515 | $200,000 | 07/01/89 06/30/92 | Phenotypic and Functional Analysis of Non T/Non B Cells in Ruminants |
| University of Wisconsin Madison, WI 53706 | Marion L. Greaser | 89-37265-4894 8900670 | $170,000 | 09/15/89 09/30/91 | Myofibril Assembly in Mammalian Skeletal Muscle |

TOTAL : $ 2,102,500

## ANIMAL SCIENCE

The emphasis in this research program is to improve reproductive efficiency in domestic farm animals. Research is supported in all possible problem areas: puberty, ovulation, corpus luteum formation and function, sperm physiology, insemination, fertilization, prenatal death, and poor survival of offspring.

## BRUCELLOSIS

The Brucellosis program supports research at the molecular, cellular, and genetic levels that: define the mechanisms by which Brucella abortus induces disease in cattle and persists as an infectious agent; defines the basis of the bovine immune response with B. abortus that results in protective immunity; through molecular techniques identifies and produces immunogens to stimulate long-lived protective immunity in cattle; identifies and produces antigens to differentiate among non-infected, vaccinated and B. abortus - infected cattle.

## ANIMAL REPRODUCTIVE RESEARCH

This sub-program area supports innovative research in the following categories: (a) Mechanisms affecting embryo survival, endocrinological control of embryo development, mechanisms of embryo-maternal interactions, and embryo implantation; (b) gamete physiology, primarily gametogenesis including maturation processes, follicle growth, ovulation, corpus luteum formation and function and superovulation; fundamental processes of fertilization mechanisms regulating gamete survival in vivo and in vitro, and basic questions regarding gamete transport and (c) fundamental questions addressing parturition, postpartum interval to conception and neonatal survival.

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | Wallis H. Clark | 89-37240-4770 8901728 | $144,000 | 09/15/89 09/30/91 | Attainment of Competency in the Sperm of the Marine Shrimp, Sicyonia ingentis |
| University of California Davis, CA 95616 | Jimmy L. Spearow | 89-37240-4909 8902269 | $194,000 | 09/15/89 09/30/91 | Mapping and Identification of Genes Controlling Reproduction in Mice |
| Colorado State University Fort Collins, CO 80523 | Terry M. Nett | 89-37240-4788 8901672 | $234,000 | 09/01/89 08/31/92 | Regulation of FSH Synthesis and Secretion |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Florida Gainesville, FL 32611 | William W. Thatcher | 89-37240-4583 8901639 | $240,000 | 09/01/89 08/31/92 | Function of Bovine Trophoblash Protein-1 Secreted by the Conceptus |
| University of Florida Gainesville, FL 32611 | Fuller W. Bazer | 89-37240-4638 8901752 | $153,000 | 09/01/89 08/31/91 | Porcine Conceptus Endometrial Interactions Affecting Embryonic Survival |
| Iowa State University of Science and Technology Ames, IA 50011 | Stephen P. Ford | 89-37240-4806 8901729 | $182,000 | 09/01/89 08/31/91 | Pine Needle Abortion in Cattle: Physiology and Bioassay of the Active Component |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Southern Illinois University Carbondale, IL 62901 | Andrzej Bartke | 89-37240-4584 8901704 | $205,000 | 09/01/89 08/31/92 | Mechanisms Responsible for Poor Reproductive Performance of Transgenic Animals |
| University of Illinois Urbana, IL 61801 | Janice M. Bahr | 89-37240-4769 8901666 | $267,000 | 09/15/89 09/30/92 | Androgen and Estrogen Biosynthesis in Theca Cells of the Domestic Hen |
| University of Michigan Ann Arbor, MI 48109 | Douglas L. Foster | 89-37240-4561 8901690 | $187,000 | 09/01/89 08/31/92 | Sexual Differentiation of Reproductive Neuroendocrine Function |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Minnesota St. Paul, MN 55104 | Bo G. Crabo | 89-37240-4755 8902133 | $151,700 | 09/01/89 08/31/91 | Development of an Assay of Fertility of Preserved Semen |
| University of Missouri Columbia, MO 65211 | R. Michael Roberts | 89-37240-4586 8901602 | $250,000 | 09/15/89 09/30/92 | Structure, Function and Hormonal Control of Synthesis of Porcine Uterine Proteins |
| An Individual Award Columbia, MO 65201 | Jeffrey A. Hall | 89-37240-4772 8901772 | $60,000 | 09/01/89 08/31/91 | Investigations on the Uterotropic Actions of Relaxin in the Pig |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Missouri<br>Columbia, MO 65211 | Robert J. Moffatt | 89-37240-4807<br>8901683 | $174,000 | 09/01/89<br>08/31/92 | Uterine Transport of Riboflavin in Swine |
| North Carolina State University<br>Raleigh, NC 27695-7003 | John E. Gadsby | 89-37240-4680<br>8901651 | $164,000 | 09/01/89<br>08/31/92 | Control of Luteolysis in the Pig |
| Rutgers, The State University<br>New Brunswick, NJ 08903 | Juan-Pablo Advis | 89-37240-4587<br>8901570 | $217,000 | 09/01/89<br>08/31/92 | Neuroendocrine Control of Reproduction in the Ewe |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Medicine and Dentistry of New Jersey<br>Piscataway, NJ 08854-5635 | Gordon J. MacDonald | 89-37240-4834<br>8902273 | $215,000 | 09/01/89<br>08/31/92 | Immunoneutralization of Gonadotropins in Domestic Animals |
| University of Nevada<br>Reno, NV 89557-0025 | Duane L. Garner | 89-37240-4736<br>8901775 | $123,000 | 09/01/89<br>08/31/92 | Automated Assessment of Bovine Sperm Fertilizing Potential |
| Cornell University<br>Ithaca, NY 14853 | W. Bruce Currie | 89-37240-4439<br>8900433 | $175,000 | 07/01/89<br>06/30/91 | Placental Lactogen and Fetal Growth |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | William Hansel | 89-37240-4563<br>8901592 | $222,000 | 08/01/89<br>07/31/91 | Interactions Between the Small and Large Bovine Luteal Cells |
| Cornell University<br>Ithaca, NY 14853 | John E. Parks | 89-37240-4773<br>8901654 | $110,000 | 09/01/89<br>08/31/91 | Cryobehavior of Bovine Oocytes, Ova and Zygotes Developed in Vitro and in Vivo |
| University of Cincinnati<br>College of Medicine<br>Cincinnati, OH 45267 | Andrew R. LaBarbera | 89-37240-4805<br>8901607 | $203,000 | 09/01/89<br>08/31/92 | Autoregulation of Porcine Granulosa Cell FSH Receptor |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Ohio State University Research Foundation Columbus, OH 43212 | Joy L. Pate | 89-37240-4774 8902134 | $183,000 | 09/01/89 08/31/92 | Immune Response Mechanisms in Luteolysis |
| Pennsylvania State University University Park, PA 16802 | Gary J. Killian | 89-37240-4771 8901590 | $179,000 | 09/01/89 08/31/91 | Effect of Oviduct Fluid Composition on Sperm Motility and Capacitation |
| University of Tennessee Knoxville, TN 37901-1071 | John E. Wilkinson | 89-37240-4440 8900692 | $160,000 | 08/01/89 07/31/91 | Role of Transforming Growth Factors on Bovine Placental Growth and Development |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| U.S. Dept. of Energy, Oak Ridge Operations Oak Ridge, TN 37831-8622 | Peter Mazur | 89-37240-4681 8901519 | $143,000 | 09/01/89 08/31/91 | Fundamental Cryobiology of Bull and Ram Spermatozoa |
| University of Wisconsin Madison, WI 53706 | Jack Gorski | 89-37240-4560 8901604 | $115,000 | 08/01/89 07/31/91 | Embryonic Development of Estrogen-Response Systems in the Bovine |
| University of Wisconsin Madison, WI 53706 | Barry D. Bavister | 89-37240-4562 8901640 | $209,000 | 08/01/89 07/31/92 | Analysis of Growth Promoter Effects of Oviductal Cells on Bovine Embryos |

Competitive Research Grants Program
Animal Science - Animal Reproductive Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin Madison, WI 53706 | John J. Parrish | 89-37240-4585 8901663 | $198,000 | 09/01/89 08/31/92 | The Mechanism and Modulation of Sperm Capacitation |
| West Virginia University Morgantown, WV 26506 | Roy L. Butcher | 89-37240-4714 8901670 | $180,000 | 09/01/89 08/31/92 | Roles of the Follicle, Oocyte and Uterus in Conception Rates in Cattle |

TOTAL : $ 5,237,700

Competitive Research Grants Program
Animal Science - Brucellosis

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oklahoma State University<br>Stillwater, OK 74078 | John H. Wyckoff | 89-37241-4683<br>8901706 | $100,000 | 09/01/89<br>08/31/92 | Identification of Immunodominant Brucella abortus Antigens with Bovine T Cells |
| University of Wisconsin<br>Madison, WI 53706 | Gary A. Splitter | 89-37241-4704<br>8901580 | $350,300 | 09/15/89<br>09/30/92 | Brucella abortus Antigens: Bovine Macrophage Activation and Lymphocyte Recognition |

TOTAL : $ 450,300

## PEST SCIENCE

Before successful strategies for managing insect pests can be developed, a strong basic insect biology research effort is needed. This program provided support for basic studies on four specific pests: bollweevil, bollworm, pine bark beetle, and gypsy moth. Emphasis is on the following research areas: insect-host interactions, population dynamics, behavioral ecology and physiology, genetics (population and molecular), chemical ecology, endocrinology, biochemistry, and interactions of insect pathogens parasites, and predator with their pest hosts.

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | William S. Bowers | 89-37250-4589<br>8901540 | $100,000 | 09/01/89<br>08/31/91 | Chemistry and Sensory Mechanism of Boll Weevil Oviposition Deterrents |
| University of Arizona<br>Tucson, AZ 85721 | Thomas Christensen | 89-37250-4707<br>8901312 | $100,000 | 09/01/89<br>08/31/91 | Neural Regulation of Sex Pheromone in Biosynthesis in Heliothis Species |
| University of California<br>Berkeley, CA 94720 | David L. Wood | 89-37250-4588<br>8901338 | $150,000 | 09/01/89<br>08/31/92 | Bark Beetle, Fungus and Host Interactions Involved in the Death of Pines |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | Sean S. Duffey | 89-37250-4639 8901510 | $50,000 | 07/01/89 06/30/90 | Plant Enzymes: Antinutritional Defenses Against Insect Herbivores |
| University of California Riverside, CA 92521 | Sarjeet S. Gill | 89-37250-4521 8901322 | $180,000 | 09/01/89 08/31/92 | Interaction of Bacillus thuringiensis Toxins with Heliothis virescens Midgut |
| University of Florida Gainesville, FL 32611 | Jon D. Johnson | 89-37250-4522 8901501 | $100,000 | 08/01/89 07/31/91 | Ethylene's Role in the Induced Host Resistance to Bark Beetles and Vectored Fungi |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/ARS South Atlantic Area<br>Athens, GA 30613 | James H. Tumlinson | 89-37250-4826<br>8901268 | $100,000 | 09/15/89<br>09/30/91 | Endogenous Inhibition of Pheromone Biosynthsis in Heliothis Moths |
| University of Kentucky Research Foundation<br>Lexington, KY 40506-0057 | Douglas L. Dahlman | 89-37250-4705<br>8901368 | $100,000 | 09/01/89<br>08/31/91 | Alteration of Heliothis Physiology by Parasitoid Teratocytes |
| USDA/Forest Service<br>New Orleans, LA 70113 | Peter B. Turchin | 89-37250-4523<br>8901523 | $100,000 | 09/15/89<br>09/30/91 | Analysis of Intraforest Dispersal in Southern Pine Beetle |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Massachusetts Amherst, MA 01003 | John P. Burand | 89-37250-4640 8901503 | $180,000 | 09/01/89 08/31/92 | Evolutionary Interactions of the Gypsy Moth and Its Nuclear Polyhedrosis Virus |
| University of Massachusetts Amherst, MA 01003 | Joseph S. Elkinton | 89-37250-4684 8901321 | $133,898 | 09/01/89 08/31/92 | Interaction Between Gypsy Moth, the White-footed Mouse and Acorn Production |
| University of Maryland College Park, MD 20742 | Jerome C. Regier | 89-37250-4520 8901192 | $100,000 | 08/01/89 07/31/91 | Developmental Studies on Chorion Formation in Lymantria dispar |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University Ithaca, NY 14853 | Tom L. Pannabecker | 89-37250-4519 8901364 | $69,000 | 09/01/89 08/31/91 | Exploring a New Approach to Pest Control: Disrupting Salt and Water Balance |
| Cornell University Ithaca, NY 14853 | Wendell L. Roelofs | 89-37250-4565 8901316 | $11,000 | 08/01/89 07/31/90 | Analysis of Biogenic Amines in the Gypsy Moth |
| Oregon State University Corvallis, OR 97331 | George F. Rohrmann | 89-37250-4706 8901333 | $100,000 | 09/01/89 08/31/91 | Production of a Functional Map of the Genome of the Lymantria dispar NPV |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| USDA/Forest Service<br>Broomall, PA 19008 | Andrew M. Liebhold | 89-37250-4533<br>8901502 | $106,000 | 09/01/89<br>08/31/91 | Landscape Study of Gypsy Moth Spatial Dynamics |
| USDA/Forest Service<br>Broomall, PA 19008 | William M. Healy | 89-37250-4789<br>8901307 | $46,102 | 09/01/89<br>08/31/92 | Interaction between Gypsy Moth, the White-Footed Mouse and Acorn Production |
| Pennsylvania State University<br>University Park, PA 16802 | MaryCarol Rossiter | 89-37250-4590<br>8901317 | $120,000 | 08/01/89<br>07/31/91 | Genetic and Environmental Control of Egg Provisioning by the Gypsy Moth |

Competitive Research Grants Program
Pest Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER<br>PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD<br>FROM<br>TO | TITLE |
|---|---|---|---|---|---|
| Clemson University<br>Clemson, SC 29631 | David G. Heckel | 89-37250-4564<br>8901352 | $50,000 | 08/01/89<br>07/31/90 | Basic and Applied Genetic Linkage Mapping in Heliothis virescens |

TOTAL : $ 1,896,000

## HUMAN REQUIREMENTS FOR NUTRIENTS (HUMAN NUTRITION)

The emphasis in this program area is on determining human requirements for nutrients. Support is not provided for clinical research or for demonstration of action projects.

Research in human nutrition contributes to improving human nutritional status by increasing our understanding of requirements for nutrients. Findings help fill the gaps of our knowledge related to nutrient requirements, bioavailability, the interrelationships of nutrients, and the nutritional value of food consumed in the United States, and of the nutrient condition of healthy individuals as all of these relate to these requirements. Studies of the biochemical and molecular basis for nutrient requirements will help determine why a nutrient is required and what its function is in the cell. Molecular biology of factors interacting with nutrients, such as receptors, carrier proteins and binding proteins, is also studied. Innovative approaches to these fundamental research problems are encouraged.

Competitive Research Grants Program
Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Arizona<br>Tucson, AZ 85721 | K. Y. Lei | 89-37200-4423<br>8900818 | $111,000 | 07/01/89<br>06/30/92 | Dietary Copper: Lipoprotein Synthesis, Intracellular Processing and Secretion |
| University of California<br>Davis, CA 95616 | Robert B. Rucker | 89-37200-4429<br>8900782 | $123,000 | 07/01/89<br>06/30/91 | The Nutritional Essentiality of Pyrroloquinoline Quinone |
| University of California<br>Davis, CA 95616 | Kathryn G. Dewey | 89-37200-4450<br>8900777 | $90,000 | 06/01/89<br>05/31/91 | Comparison of Nutrient Intake and Growth of Breast - and Formula-Fed Infants |

Competitive Research Grants Program
Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Iowa State University of Science and Technology Ames, IA 50011 | Robert E. Serfass | 89-37200-4453 8900887 | $23,000 | 09/01/89 08/31/90 | Boron Content and Isotope Ratio of Nutritional Samples: Preparation and Analyses |
| University of Illinois Urbana, IL 61801 | John W. Erdman | 89-37200-4452 8900766 | $120,000 | 09/01/89 08/31/91 | The Pre-Ruminant Calf as a Model for the Study of Human Carotenoid Metabolism |
| Purdue Research Fdn. West Lafayette, IN 47907 | Connie M. Weaver | 88-37200-3695 8902535 | $50,000 | 07/01/88 06/30/90 | Exchangeability and Absorption of Calcium in Humans |

Competitive Research Grants Program
Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Michigan State University<br>East Lansing, MI 48824 | Pamela J. Fraker | 88-37200-3696<br>8902421 | $50,000 | 07/01/88<br>06/30/90 | Alteration of Immune Development by Gestational Zinc Deprivation |
| Michigan State University<br>East Lansing, MI 48824 | Maija H. Zile | 89-37200-4424<br>8900637 | $122,000 | 08/01/89<br>07/31/91 | Metabolism and Function of Retinoic Acid in the Small Intestine |
| North Carolina State University<br>Raleigh, NC 27695-7003 | Jason C. Shih | 88-37200-3536<br>8902594 | $50,000 | 07/01/88<br>06/30/90 | Cholesterol Effect on the Expression of Viral Genes in Atherogenesis |

Competitive Research Grants Program
Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | Joseph H. Hotchkiss | 89-37200-4454<br>8900744 | $139,000 | 08/01/89<br>07/31/91 | Vitamin C and Cancer Prevention Through Inhibition of Endogenous Nitrosation |
| Pennsylvania State University<br>University Park, PA 16802 | John Beard | 89-37200-4451<br>8900735 | $70,000 | 07/01/89<br>06/30/91 | Thyroid Hormone Metabolism in Iron Deficiency Anemia |

TOTAL : $ 948,000

## SPECIAL RESEARCH GRANTS PROGRAM

The objective of this grant program is to carry out research to facilitate or expand promising breakthroughs in areas of food and agricultural sciences of importance to the Nation. Two major areas of research were funded under this program during fiscal year 1989:

| | |
|---|---|
| Animal Health Research | $5,408,340 |
| Aquaculture Research | 137,460 |
| TOTAL | $5,545,800 |

This program is administered under the authority of Section 2(c) (1) of P.L. 89-106, as amended. Eligible institutions include land-grant colleges and universities, State agricultural experiment stations, and all colleges and universities having a demonstrable capacity in food and agricultural research.

A brief description of each of the two areas of research in the Special Research Grants Program follows with a listing of research grants awarded in each for FY 1988.

## ANIMAL HEALTH

Overall, this research is to develop and/or refine biological and chemical methods to suppress animal losses from infectious and noninfectious diseases and internal and external parasites. The research is directed toward clarifying infectious and noninfectious diseases and parasites and their interactive effects on animal health; and to develop practical and implementable management systems for the producer to prevent or alleviate these causes of animal losses.

Research includes clarification of complex or unknown etiologies, development or improvement of diagnostic methodologies, clarification of disease pathogenesis and methods of transmission, studies of resistance mechanisms and resistance-enhancing factors and development of disease prevention, control or eradication technologies.

Research is centered on highest priority animal health problems of beef and dairy cattle, swine, poultry, sheep and goats, horses and aquaculture species as identified by the Animal Health Science Research Advisory Board. The Advisory Board recommended that funding be made available for Animal Welfare Studies and Salmanellosis, especially the Salmonella enteritidis problem. This includes studies on major causes of disease losses in beef and dairy cattle production such as the respiratory disease complex, reproductive diseases including brucellosis and anestrus, enteric and digestive diseases, mastitis, bluetongue, parasites and metabolic diseases. Research on swine centers on health hazards such as enteric, reproductive and respiratory diseases, and other major problems such as pseudorabies and trichinosis. Poultry disease studies include respiratory diseases, skeletal problems, enteric, neoplastic and immunologic disorders. Sheep research includes diseases such as food rot, respiratory diseases, parasites and bluetongue. Equine health research centers on respiratory, enteric and reproductive diseases and musculo-skeletal disorders. Research on diseases in aquaculture species also is included.

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Auburn University<br>Auburn University, AL 36849 | D. A. Stringfellow | 89-34116-4632<br>8901840 | $72,686 | 09/01/89<br>08/31/91 | Development of Zona Pellucida-Intact Bovine Embryos After Chemical Disinfection |
| Auburn University<br>Auburn University, AL 36849 | Lloyd H. Lauerman | 89-34116-4783<br>8901845 | $49,999 | 09/15/89<br>09/30/91 | Isolation of the Gene Encoding 46 kD Outer Membrane Protein of Haemophilus somnus |
| Auburn University<br>Auburn University, AL 36849 | S. D. Worley | 89-34116-4852<br>8901978 | $50,000 | 09/15/89<br>09/30/91 | Evaluation of N Halamines for Use of Disinfectants for the Control of Salmonella |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Auburn University<br>Auburn University, AL 36849 | Victor S. Panangala | 89-34116-4856<br>8902016 | $50,000 | 09/01/89<br>08/31/92 | Characterize Adhesins and Develop Genomic DNA Probes for Detection of Avian Mycoplasmas |
| University of Alabama<br>Birmingham, AL 35294 | David E. Briles | 89-34116-4879<br>8901975 | $100,000 | 09/15/89<br>09/30/92 | A Live Salmonella Enteritidis Vaccine for Use in Poultry |
| University of California<br>Davis, CA 95616 | N. James MacLachlan | 89-34116-4447<br>8901834 | $148,951 | 09/15/89<br>09/30/91 | The Pathogenesis of Bluetongue Virus Infection of Cattle |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | Bennie I. Osburn | 89-34116-4780 8902061 | $40,000 | 09/01/89 08/31/91 | Bluetongue Virus Detection in Semen using Polymerase Chain Reaction |
| University of California Davis, CA 95616 | Bradford P. Smith | 89-34116-4854 8901913 | $111,751 | 09/01/89 08/31/92 | Serum Immunoglobulin Profiles to Salmonella dublin for Detection of Carrier Cows |
| University of California Davis, CA 95616 | Laurel J. Gershwin | 89-34116-4878 8902069 | $117,384 | 09/15/89 09/30/91 | IgE, Bovine Respiratory Syncytial Virus, and Allergic Reactivity in Cattle |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of California Davis, CA 95616 | Richard Yamamoto | 89-34116-4945 8902009 | $110,000 | 09/15/89 09/30/91 | Avian Mycoplasma DNA Probes, Antigens and Polymerase Chain Reaction |
| University of California, San Diego La Jolla, CA 92093 | Lynette B. Corbeil | 89-34116-4445 8901854 | $149,997 | 09/01/89 08/31/91 | Diagnosis of Bovine Trichomoniasis with Recombinant Antigen |
| Stanford University Stanford, CA 94305 | Peter D. O'Hanley | 89-34116-4952 8901938 | $150,000 | 09/15/89 09/30/91 | Construction of a Live Vaccine for the Prevention of Porcine Pleuropneumonia |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Colorado State University<br>Fort Collins, CO 80523 | David W. Reduker | 89-34116-4549<br>8901876 | $110,000 | 09/01/89<br>08/31/91 | Eimeria Bovis Proteins Expressed on the Surface of Infected Cells Induce Protective Immunity |
| Colorado State University<br>Fort Collins, CO 80523 | James K. Collins | 89-34116-4629<br>8901847 | $135,077 | 09/01/89<br>08/31/92 | Epitope Specificity of the Humoral Immune Response to Bovine Herpesvirus Type 1 |
| Colorado State University<br>Fort Collins, CO 80523 | Alan Tucker | 89-34116-4631<br>8901846 | $115,101 | 09/01/89<br>08/31/91 | Cold-Induced Hypoventilation and Altered Pulmonary Deposition Clearance in Calves |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Colorado State University<br>Fort Collins, CO 80523 | Leonard D. Pearson | 89-34116-4759<br>8902055 | $40,000 | 09/01/89<br>08/31/90 | Immunoassay for Rapid Detection of Ovine Lentivirus Infection |
| Colorado State University<br>Fort Collins, CO 80523 | Robert P. Ellis | 89-34116-4925<br>8902099 | $110,000 | 09/15/89<br>09/30/92 | Amplification, Cloning, Sequencing and Grouping of B. nodosus Pilin Genes |
| University of Connecticut<br>Storrs, CT 06269-2086 | H. J. Van Kruiningen | 89-34116-4860<br>8901902 | $76,543 | 09/01/89<br>08/31/91 | Role of Coronavirus in Winter Dysentery of Dairy and Beef Cattle |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Delaware<br>Newark, DE 19711 | Calvin L. Keeler | 89-34116-4882<br>8902008 | $48,000 | 09/01/89<br>08/31/91 | In vivo and in vitro Comparisons of Vaccine and Clinical Isolates of Laryngotracheitis Virus |
| University of Florida<br>Gainesville, FL 32611 | Michael W. Riggs | 89-34116-4550<br>8902077 | $132,959 | 09/01/89<br>08/31/91 | Anti-idiotypic Antibodies for Vaccination Against Bovine Cryptosporidiosis |
| University of Georgia Research Foundation, Inc.<br>Athens, GA 30602 | E. Susan Clark | 89-34116-4551<br>8902264 | $33,172 | 08/01/89<br>07/31/90 | Endotoxemia in Dairy Cattle: Mechanism of Reticulo-ruminal Stasis |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Georgia Research Foundation, Inc. Athens, GA 30602 | James N. Moore | 89-34116-4946 8902103 | $50,000 | 09/15/89 09/30/90 | Dietary Modification of In Vitro Responses to Bacterial Endotoxin |
| Iowa State University of Science and Technology Ames, IA 50011 | Lawrence H. Arp | 89-34116-4627 8902010 | $70,000 | 09/01/89 08/31/92 | Respiratory Immune Response to Bordetella avium in Turkeys |
| Iowa State University of Science and Technology Ames, IA 50011 | R. F. Rosenbusch | 89-34116-4782 8901842 | $100,000 | 09/15/89 09/30/91 | Diagnostic Reagents for Bovine Respiratory Mycoplasmas |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Iowa State University of Science and Technology Ames, IA 50011 | Joseph S. Haynes | 89-34116-4784 8901994 | $85,489 | 09/01/89 08/31/92 | Tibial Dyschondroplasia: Mechanisms Involved in Angiogenesis Failure |
| Iowa State University of Science and Technology Ames, IA 50011 | Prem S. Paul | 89-34116-4858 8901960 | $98,585 | 09/15/89 09/30/91 | Molecular Probes for Studies on Epidemiology of Porcine Rotavirus Infections |
| University of Illinois Urbana, IL 61801 | Cynthia J. Holland | 89-34116-4881 8902049 | $62,250 | 09/01/89 08/31/91 | Evaluation of Transplacental Infection by Ehrlichia risticii |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Illinois<br>Urbana, IL 61801 | Stanley E. Curtis | 89-34116-4947<br>8901988 | $50,000 | 09/15/89<br>09/30/91 | Assessing Pig Welfare: Ethology, Immunology, and Physiology |
| Kansas State University<br>Manhattan, KS 66506 | P. Gopal Reddy | 89-34116-4832<br>8902067 | $78,440 | 09/01/89<br>08/31/91 | Molecular Mechanisms of Immunosuppression in Bovine Respiratory Disease |
| Louisiana State University and A&M College<br>Baton Rouge, LA 70893-0905 | Johannes Storz | 89-34116-4675<br>8901905 | $100,000 | 09/01/89<br>08/31/92 | Immunogenicity and Antigenic Diversity of Bovine Coronaviruses |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Massachusetts Amherst, MA 01003 | Richard A. Goldsby | 89-34116-4630 8901972 | $100,000 | 08/01/89 07/31/91 | Immunological Indicators of Salmonella Enteritidis Invasiveness |
| University of Maryland College Park, MD 20742 | Siba K. Samal | 89-34116-4855 8901865 | $149,997 | 09/01/89 08/31/92 | Detection of Bovine Respiratory Syncytial Virus Infections by Nucleic Acid Hybridization |
| University of Maine Orono, ME 04469 | H. Michael Opitz | 89-34116-4760 8901973 | $100,000 | 09/01/89 08/31/89 | Salmonella enteritidis: Epidemiology, Virulence Factors, and Pathogenesis |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Michigan State University<br>East Lansing, MI 48824 | Roger K. Maes | 89-34116-4884<br>8901932 | $50,000 | 09/01/89<br>08/31/90 | Polymerase Chain Reaction Based Detection of Pseudorabies Virus Latency |
| University of Minnesota<br>St. Paul, MN 55104 | Connie J. Gebhart | 89-34116-4877<br>8901943 | $88,808 | 09/01/89<br>02/28/91 | The Intracellular Organism in Swine Proliferative Enteritis |
| University of Minnesota<br>St. Paul, MN 55104 | Robert B. Morrison | 89-34116-4924<br>8901931 | $50,000 | 09/15/89<br>09/30/92 | Swine Herds Having a Low Prevelance of Adults Sero-Positive for Pseudorabies Virus |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Minnesota* St. Paul, MN 55108 | Eric M. Hallerman | S89-34123-4634* 8902027 | $5,097* | 09/01/89 08/31/91 | Development of Immunogenetic Markers for Aquaculture Species |
| University of Nebraska Lincoln, NE 68583-0704 | Fernando A. Osorio | 89-34116-4761 8901939 | $50,000 | 09/01/89 08/31/90 | An Accurate Determination of the Pseudorabies of Swine Herds with Single Reactors |
| Rutgers, The State University New Brunswick, NJ 08903 | Susan E. Ford | 89-34116-4553 8902019 | $37,020 | 09/01/89 08/31/91 | Nucleic Acid Probes for the Oyster Parasite Haplosporidium nelsoni (MSX) |

*Grant split-funded with the Aquaculture Research area where actual count is included. Total amount awarded $78,323.

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Ohio State University Research Foundation Columbus, OH 43212 | Linda J. Saif | 89-34116-4548 8901886 | $100,000 | 09/01/89 08/31/92 | Protein and Epitope Specific Immune Responses to Bovine Coronavirus in Calves |
| Ohio State University Research Foundation Columbus, OH 43212 | Linda J. Saif | 89-34116-4625 8901920 | $95,403 | 09/01/89 08/31/91 | Serotypic Characterization of Porcine Rotaviruses using Gene 9 cDNA Probes |
| Ohio State University Research Foundation Columbus, OH 43212 | Yasuko Rikihisa | 89-34116-4628 8902100 | $50,000 | 09/15/89 09/30/90 | Detection of Ehrlichia risticii Antigen by Capture Enzyme Immunoassay |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Ohio State University Research Foundation Columbus, OH 43212 | Daral J. Jackwood | 89-34116-4831 8902006 | $135,000 | 09/01/89 08/31/92 | Protective Antigens of Infectious Bursal Disease Virus: Molecular Studies on Viral Proteins |
| Ohio State University Research Foundation Columbus, OH 43212 | Linda J. Saif | 89-34116-4885 8901969 | $89,909 | 09/01/89 08/31/91 | Development of Antisera and Diagnostic Tests for Serogrouping Avian Rotaviruses |
| Miami University Oxford, OH 45056 | Anne M. Hooke | 89-34116-4883 8901965 | $25,000 | 09/15/89 09/30/90 | Studies on the Development of a Live Vaccine Strain of S. Enteritidis |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oklahoma State University<br>Stillwater, OK 74078 | John H. Wyckoff | 89-34116-4822<br>8901816 | $40,000 | 08/15/89<br>08/31/92 | Identification of T Cell Vaccine Candidates for Brucella Abortus in Cattle |
| Oklahoma State University<br>Stillwater, OK 74078 | Derek A. Mosier | 89-34116-4880<br>8901849 | $96,744 | 09/01/89<br>08/31/91 | A Subunit Vaccine for Bovine Pneumonic Pasteurellosis |
| Oregon State University<br>Corvallis, OR 97331 | Alvin W. Smith | 88-34116-3736<br>8902060 | $80,417 | 07/15/88<br>07/31/91 | Recombinant Pilin Subunit Vaccine for Ovine Footrot |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Oregon State University Corvallis, OR 97331 | John S. Rohovec | 89-34116-4552 8902018 | $66,050 | 09/01/89 08/31/92 | Starvation-Survival in Waterborne Transmission of Renibacterium salmoninarum |
| Oregon State University Corvallis, OR 97331 | Masakazu Matsumoto | 89-34116-4857 8902000 | $44,378 | 09/01/89 08/31/90 | Attachment and Invasion of P. Multocida in the Respiratory Tract of Turkeys |
| Univ. of Pennsylvania Philadelphia, PA 19104 | Charles R. Curtis | 89-34116-4781 8902643 | $125,000 | 09/15/89 09/30/92 | Abnormal Lipid Utilization and Liver Dysfunction in Dairy Cattle |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Pennsylvania State University<br>University Park, PA 16802 | Richard A. Wilson | 89-34116-4547<br>8901889 | $120,000 | 08/01/89<br>07/31/91 | Effects of the Bovine Mammary Gland Environment on Leukocyte Markers and Function |
| Pennsylvania State University<br>University Park, PA 16802 | F. G. Ferguson | 89-34116-4859<br>8901945 | $101,000 | 09/15/89<br>09/30/91 | Piglet Enteric Cellular Immune Responses |
| South Dakota State University<br>Brookings, SD 57007 | David H. Francis | 89-34116-4654<br>8901955 | $149,406 | 08/01/89<br>07/31/92 | Selection of Hereditary Disease Resistance by Analysis of Cellular Receptors |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Tennessee<br>Knoxville, TN 37901-1071 | John E. Wilkinson | 89-34116-4446<br>8901835 | $149,653 | 07/01/89<br>06/30/92 | Transforming Growth Factors in Early Pregnancy in the Cow |
| University of Tennessee<br>Knoxville, TN 37901-1071 | Jack W. Oliver | 89-34116-4633<br>8902263 | $125,000 | 09/01/89<br>08/31/91 | Toxic Fescue Alkaloid Effects on Catecholamine Receptors in Bovine Vasculature |
| Virginia Polytechnic Institute and State University<br>Blacksburg, VA 24061 | Thomas J. Inzana | 89-34116-4529<br>8901837 | $130,000 | 09/01/89<br>08/31/91 | Prevention of Haemophilus somnus Reproductive Disease with a Subunit Vaccine |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin Madison, WI 53706 | Ronald D. Schultz | 89-34116-4528 8901827 | $99,979 | 09/15/89 09/30/92 | Role of Cytotoxic Lymphocytes in Protective Immunity to BVD Virus |
| University of Wisconsin Madison, WI 53706 | Susan D. Semrad | 89-34116-4626 8901817 | $38,628 | 08/01/89 07/31/90 | Bovine Endotoxemia: Identification of Mediators and Their Pattern of Release |
| University of Wisconsin Madison, WI 53706 | G. J. Letchworth | 89-34116-4853 8901860 | $150,000 | 09/01/89 08/31/92 | Constitutive Resistance to Herpesviral Infection in Transgenic Mice |

Special Research Grants Program
Animal Health Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Wisconsin Madison, WI 53706 | William L. Castleman | 89-34116-4923 8901866 | $119,467 | 09/15/89 09/30/91 | Effects of 4 Ipomeanol on Bovine Viral Pneumonia |

TOTAL : $ 5,408,340

## AQUACULTURE RESEARCH

The purpose of this program area is to provide and/or improve upon the scientific and technical base needed by the aquaculture industry. This industry has been expanding rapidly. Problems of nutrition, breeding, physiology, management, disease and parasite control are important and are becoming more limiting as the size of the industry and its concentration have increased.

Interest is focused on local and regional problems for which solutions will contribute to national objectives related to aquaculture production.

The specific objective of the research is improved production efficiency through disease and parasite control.

Special Research Grants Program
Aquaculture Research

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| University of Minnesota*<br>St. Paul, MN 55108 | Eric M. Hallerman | 89-34123-4634*<br>8902027 | $73,226* | 09/01/89<br>08/31/91 | Development of Immunogenetic Markers for Aquaculture Species |
| Mississippi State University<br>Mississippi State, MS 39762 | John R. MacMillan | 89-34123-4530<br>8902028 | $64,234 | 07/01/89<br>06/30/93 | Life Cycle Determination of the Proliferative Gill Disease Organism in Catfish |

TOTAL : $ 137,460

## RANGELAND RESEARCH GRANTS PROGRAM

Rangeland Research grants are awarded to support basic research in certain areas of rangeland research such as: (1) management of rangelands as integrated systems, (2) methods of managing rangeland watersheds to maximize efficient use of riparian areas, water and to improve water yield, water quality and water conservation, and (3) revegetation and rehabilitation of rangeland including the control of undesirable species of plants.

Rangeland Research Grants Program
Rangeland Research Grants

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Colorado State University<br>Fort Collins, CO 80523 | W. C. Trlica | 89-38300-4513<br>8901259 | $72,000 | 09/01/89<br>08/31/91 | Water Quantity and Quality as Affected by Grazing in a Mountainous Riparian Zone |
| Oregon State University<br>Corvallis, OR 97331 | Peter B. McEvoy | 89-38300-4515<br>8901275 | $25,000 | 07/01/89<br>06/30/90 | Reliability of Weed Control by Exotic Insects |
| South Dakota State University<br>Brookings, SD 57007 | Patricia S. Johnson | 89-38300-4506<br>8901221 | $56,991 | 07/01/89<br>06/30/93 | Optimizing Diet Quality for Cattle Grazing Native and Introduced Grass Pastures |

Rangeland Research Grants Program
Rangeland Research Grants

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Texas A&M University System College Station, TX 77843 | W. R. Ocumpaugh | 89-38300-4505 8901250 | $55,000 | 09/01/89 08/31/91 | Dissemination of Seed by Cattle: Potentials for Rangeland Revegetation |
| Texas A&M University System College Station, TX 77843 | Ronald J. Newton | 89-38300-4507 8901254 | $34,000 | 09/01/89 08/31/91 | Molecular Probes for Drought Stress in Native Range Species |
| Texas A&M University System College Station, TX 77843 | Steve R. Archer | 89-38300-4508 8901251 | $72,000 | 09/01/89 08/31/92 | Succession on Mixed Shrublands: Reconstructing the Past and Predicting the Future |

Rangeland Research Grants Program
Rangeland Research Grants

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Texas A&I University<br>Kingsville, TX 78363 | Timothy E. Fulbright | 89-38300-4479<br>8901212 | $68,000 | 09/01/89<br>08/31/92 | Physiological Responses of Shrub Seedlings to Nurse Plant Microenvironments |
| Utah State University<br>Logan, UT 84322 | F. D. Provenza | 89-38300-4514<br>8901504 | $72,000 | 07/01/89<br>06/30/93 | Reducing Damage to Riparian Habitats by Cattle Through Social Learning |

TOTAL : $ 454,991

## SMALL BUSINESS INNOVATION RESEARCH PROGRAM

The objectives of this program are to stimulate technological innovation in the private sector, to strengthen the role of small business in meeting Federal research and development needs, to increase private sector commercialization and development efforts, and to encourage participation of small and disadvantaged firms in technological innovation.

The program emphasizes support of high-quality research and development proposals containing advanced concepts related to important agricultural problems and opportunities that could lead to significant public benefits. The areas considered in this program are broad and encompass a wide range of agricultural sciences. The subtopics include: (1) forests and related resources, (2) plant production and protection, (3) animal production and protection, (4) air, water, and soils, (5) food science and nutrition, and (6) rural and community development.

In fiscal year 1989, USDA awarded both Phase I and Phase II grants. Phase I grants are primarily for research designed to determine technical feasibility of the proposed approach or concept. Phase II grants are awarded to those Phase I projects that have shown sufficient promise for further support. The total amount awarded in fiscal year 1989 was $3,945,512.

Small Business Innovation Research Program
Forests & Related Resources

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| KDC/ISI Joint Venture<br>400 Hester Street<br>San Leandro, CA 94577 | Bruce W. Maxfield | 89-33610-4841<br>8901228 | $215,000 | 09/15/89<br>09/30/91 | Measuring Density and Moisture Content of Wood Products using Microwaves |
| Engineering Data Management, Inc.<br>4700 McMurray Avenue<br>Fort Collins, CO 80525 | Ronald W. Anthony | 89-33610-4339<br>8900247 | $49,955 | 06/01/89<br>11/30/89 | Nondestructive Evaluation of Finger Joint Strength |
| Koskovich Engineering Services Company, Inc.<br>905 N. Broadway<br>Rochester, MN 55904 | Jerry E. Koskovich | 89-33610-4435<br>8900235 | $50,000 | 06/01/89<br>11/30/89 | Robotic Applications for Wood Roof Truss Fixturing |

Small Business Innovation Research Program
Forests & Related Resources

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| General Pneumatics Corporation<br>440 Washington Street<br>Orange, NJ 07050 | Ernest E. Atkins | 89-33610-4436<br>8900254 | $50,000 | 06/01/89<br>11/30/89 | Wood Fired, Air Charged, Ross-Stirling 3kW Power System |
| Drying Solution, Inc.<br>12 N. W. Edgewood Drive<br>Corvallis, OR 97330 | Stewart Holmes | 89-33610-4367<br>8900252 | $49,932 | 06/01/89<br>11/30/89 | Weight-based Technology for Monitoring the Moisture Content of Lumber |
| Mycorr Tech, Inc.<br>440 William Pitt Way<br>Pittsburgh, PA 15238 | Stephen B. Maul | 89-33610-4345<br>8900269 | $50,000 | 06/01/89<br>11/30/89 | Ectomycorrhizal Fungi Adapted to Arid Alkaline Soils |

Small Business Innovation Research Program
Forests & Related Resources

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| American Research Corporation of Virginia<br>P.O. Box 3406<br>Radford, VA 24143-3406 | Howard P. Groger | 89-33610-4905<br>8901229 | $195,000 | 09/15/89<br>09/30/91 | Laser Incision for Mechanical Reinforcement of Wood-based Composite Materials |
| Metriguard, Inc.<br>P.O. Box 399<br>Pullman, WA 99163 | Friend K. Bechtel | 89-33610-4906<br>8901227 | $230,000 | 09/15/89<br>09/30/91 | High-speed Tensile Strength Estimation of Lumber from Grain Angle and Modulus of Elasticity |

TOTAL : $ 889,887

Small Business Innovation Research Program
Plant Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Plant Genetics, Inc.<br>1930 Fifth Street<br>Davis, CA 95616 | Donna H. Mitten | 89-33610-4433<br>8900199 | $50,000 | 06/01/89<br>11/30/89 | Techniques for the In Vitro Production of Potato Seed Tubers |
| Plant Genetics, Inc.<br>1930 Fifth Street<br>Davis, CA 95616 | Jo Ann Fujii | 89-33610-4434<br>8900178 | $49,816 | 06/01/89<br>11/30/89 | Desiccated Somatic Seeds |
| DNA Plant Technologies, Inc.<br>6701 San Pablo Avenue<br>Oakland, CA 94608 | Karol E. P. Robinson | 89-33610-4322<br>8900204 | $48,401 | 06/01/89<br>11/30/89 | Determination of a Genotype Independent Method of Maize Transformation |

Small Business Innovation Research Program
Plant Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| DNA Plant Technologies, Inc.<br>6701 San Pablo Avenue<br>Oakland, CA 94608 | Trevor V. Suslow | 89-33610-4323<br>8900205 | $49,081 | 06/01/89<br>11/30/89 | Construction of Non-Pathogenic Pseudomonas syringae Strains to Control Bacterial Blast and Canker of Stone Fruits |
| DNA Plant Technologies, Inc.<br>6701 San Pablo Avenue<br>Oakland, CA 94608 | Pamela Dunsmuir | 89-33610-4904<br>8901233 | $175,000 | 09/15/89<br>09/30/91 | Expression of Two Distinct Bacterial Chitinase Genes in Plants |
| San Clemente Computers<br>510 N. Ave dela Estrella<br>San Clemente, CA 92672 | Peter Shikli | 89-33610-4821<br>8901231 | $150,000 | 09/15/89<br>09/30/90 | Integrated Pest Management Assistant for Citriculture |

Small Business Innovation Research Program
Plant Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| MetaGene Corporation<br>One Progress Boulevard, Box 26<br>Alachua, FL 32615 | Randy S. Fischer | 89-33610-4751<br>8901235 | $205,000 | 09/15/89<br>09/30/91 | Enzyme-targeted Antimicrobials for Plant Disease Control |
| Terronics Development Corporation<br>R.R. #2, Box 450<br>Elwood, IN 46036 | Eduardo C. Escallon | 89-33610-4764<br>8901232 | $176,022 | 09/15/89<br>09/30/91 | Improved Pesticide Efficiency Using the TotalStat Sprayer |
| Tekmat Corporation<br>200 Homer Avenue<br>Ashland, MA 01721 | Mitchell Klausner | 89-33610-4382<br>8900173 | $50,000 | 06/01/89<br>11/30/89 | Spontaneous Adhesion of Cultured Plant Cells to Gas Plasma Treated Polymer Supports |

Small Business Innovation Research Program
Plant Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Plant Science Research, Inc.<br>10320 Bren Road, East<br>Minnetonka, MN 55343 | Kenneth A. Hibberd | 89-33610-4748<br>8901236 | $225,000 | 09/01/89<br>08/31/91 | Monoclonal Antibodies to a High Methionine Storage Protein of Maize |
| Westech Products, Inc.<br>12 Running Brook Road<br>Bridgewater, NJ 08807 | William C. Whitman | 89-33610-4383<br>8900196 | $49,902 | 06/01/89<br>11/30/89 | A Greenhouse Energy Management System Providing Optimal Growing Conditions |
| Bend Research, Inc.<br>64550 Research Rd.<br>Bend, OR 97701-8599 | Scott M. Herbig | 89-33610-4343<br>8900214 | $49,852 | 06/01/89<br>11/30/89 | Development of a Long-Lasting Codling Moth Granulosis Virus Formulation |

TOTAL : $ 1,278,074

Small Business Innovation Research Program
Animal Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Arizona Biotechnology Corporation<br>1745 N. Campbell Ave.<br>Tucson, AZ 85719 | Mary E. Mapother | 89-33610-4368<br>8900124 | $48,935 | 06/01/89<br>11/30/89 | A New Diagnostic Test for Swine Dysentery |
| Idetek, Inc.<br>1057 Sneath Lane<br>San Bruno, CA 94066 | Bhanu P. Ram | 89-33610-4313<br>8900105 | $50,000 | 06/01/89<br>11/30/89 | Enzyme Immunoassay for Screening of Sulfonamides |
| Somatogenetics International, Inc.<br>350 Interlocken Pkwy, #100<br>Broomfield, CO 80020 | Steven A. Shoemaker | 89-33610-4389<br>8900128 | $50,000 | 06/01/89<br>11/30/89 | DNA Probe Test for Paratuberculosis (Johne's Disease) |

Small Business Innovation Research Program
Animal Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Athens Research and Technology, Inc.<br>P.O. Box 5494<br>Athens, GA 30604 | Paula G. Ciembor | 89-33610-4380<br>8900280 | $50,000 | 06/01/89<br>11/30/89 | A Quick Diagnostic Test to Detect a Deadly Bacteria Infecting Channel Catfish |
| Cambridge Scientific, Inc.<br>195 Common Street<br>Belmont, MA 02178 | Joseph D. Gresser | 89-33610-4763<br>8901238 | $230,000 | 09/01/89<br>08/31/91 | Multiphasic Controlled Release for Cattle Reproduction Management |
| Perfect View, Inc.<br>3909 Beryl Road<br>Raleigh, NC 27607 | A. J. Attar | 89-33610-4432<br>8900141 | $50,000 | 06/01/89<br>11/30/89 | Low-Cost Ammonia Detector for Animal Production Houses |

Small Business Innovation Research Program
Animal Production & Protection

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| BioPore, Inc.<br>P.O. Box 482<br>Centre Hall, PA 16828 | Edward G. Buss | 89-33610-4955<br>8901240 | $190,000 | 09/15/89<br>09/30/91 | Controlled - Permeability Membrane Container for Cryopreservation of Poultry Sperm |
| Sea Farm California, a Division of Sea Farm Washington, Inc.<br>P.O. Box 1478<br>Port Angeles, WA 98362 | Peter Struffenegger | 89-33610-4359<br>8900301 | $43,661 | 06/01/89<br>11/30/89 | Hormonal Induction of Sexual Maturation in Domestic White Sturgeon Females |

TOTAL : $ 712,596

Small Business Innovation Research Program
Air, Water, & Soils

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Perfect View, Inc.<br>3909 Beryl Road<br>Raleigh, NC 27607 | A. J. Attar | 89-33610-4431<br>8900091 | $50,000 | 06/01/89<br>11/30/89 | Accurate, Low-Cost Devices for Water Quality Control |
| Intercomp<br>Rt. 3, Box 212<br>Stillwater, OK 74074 | James N. Lange | 89-33610-4321<br>8900085 | $49,960 | 06/01/89<br>11/30/89 | High Resolution Soil Water Content Profiling |

TOTAL : $ 99,960

Small Business Innovation Research Program
Food Science & Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Perishables Research Organization<br>291 Zabala Road<br>Salinas, CA 93908 | Richard E. Woodruff | 89-38810-4317<br>8900051 | $50,000 | 06/01/89<br>11/30/89 | Use of Membrane Air Separator Technology for Transport of Fresh Produce |
| Universal Sensors, Inc.<br>P.O. Box 736<br>New Orleans, LA 70148 | Ahmad Suleiman | 89-33610-4318<br>8900076 | $49,995 | 06/01/89<br>11/30/89 | Fiber-Optic Biosensors in Food Analysis |
| Advanced Energy Dynamics, Inc.<br>14 Tech Circle<br>Natick, MA 01760 | Donald E. Heyburn | 89-33610-4320<br>8900073 | $50,000 | 06/01/89<br>11/30/89 | Removal of Bran from Wheat Flour |

Small Business Innovation Research Program
Food Science & Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Bend Research, Inc.<br>64550 Research Rd.<br>Bend, OR 97701-8599 | Paul van Eikeren | 89-33610-4762<br>8901242 | $215,000 | 09/01/89<br>08/31/91 | Membrane-based Process for Debittering Citrus Juice |

TOTAL : $ 364,995

Small Business Innovation Research Program
Rural & Community Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Akhiok Tribal Enterprises<br>P.O. Box 5-071<br>Akhiok, AK 99615 | William P. Osborne | 89-33610-4338<br>8900298 | $50,000 | 06/01/89<br>11/30/89 | Mariculture Technology for Economic Development, Promoting Self-Sufficiency for Rural Alaska Natives |
| Big Sky Artisans<br>802 E. Front<br>Missoula, MT 59802 | Carolyn Smith | 89-33610-4390<br>8900008 | $50,000 | 06/01/89<br>11/30/89 | Empowerment of Disadvantaged Women through Multi-Cultural Cooperative |
| Training & Development Resources<br>104 East Main Street<br>Durham, NC 27701 | Betty C. Mosley | 89-33610-4907<br>8901271 | $220,000 | 09/15/89<br>09/30/91 | Micro-business Development for Rural Adults |

Small Business Innovation Research Program
Rural & Community Development

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | TITLE |
|---|---|---|---|---|---|
| Republic Data Systems, Inc.<br>9335 Tartan View Drive<br>Fairfax, VA 22032 | Charles A. Jewell | 89-33610-4381<br>8900030 | $50,000 | 06/01/89<br>11/30/89 | An Innovative Computerized Rural Information System |
| Cascade Cashmere Company<br>200 Larson Road<br>Silver Creek, WA 98585 | Judith A. Richardson | 89-33610-4914<br>8901243 | $230,000 | 09/01/89<br>08/31/91 | Cashmere Production: A Revenue-generating Opportunity for Rural America |

TOTAL : $ 600,000

## FOOD AND AGRICULTURAL SCIENCES NATIONAL NEEDS GRADUATE FELLOWSHIPS GRANT PROGRAM

This program was initiated because of increasing concern about growing shortages of trained professionals in the food and agricultural sciences. The objective of the program is to encourage outstanding students (U.S. citizens) to pursue and complete a graduate degree in an area of the food and agricultural sciences for which there is a national need for the development of scientific expertise. The fiscal year 1989 program consisted of grants to colleges and universities with superior graduate teaching and research programs in the targeted areas of the food and agricultural sciences. Fellowships were awarded in the following areas in fiscal year 1989:

| | |
|---|---|
| Biotechnology | $ 528,000 |
| Engineering in Agriculture Production, Processing, and Distribution Systems | 528,000 |
| Food, Forest Products or Agribusiness Marketing | 528,000 |
| Food Science/Human Nutrition | 654,440 |
| Water Sciences | 528,000 |
| | $ 2,766,440 |

This program is administered under the authority of Section 1417(a)(3)(B) of P.L. 95-113, as amended (7 U.S.C. 3152). Eligible institutions include all U.S. colleges and universities which confer a graduate degree in an area of the food and agricultural sciences targeted for national needs fellowships.

National Needs Graduate Fellowships Program
Biotechnology, Animal

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| University of Illinois<br>Champaign, IL 61820 | Lawrence B. Schook | 89-38420-4416<br>8901494 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |
| Pennsylvania State University<br>University Park, PA 16802 | Craig R. Baumrucker | 89-38420-4410<br>8901467 | $48,000 | 09/01/89<br>08/31/94 | 1 | Doctoral |
| Washington State University<br>Pullman, WA 99164-5045 | Guy H. Palmer | 89-38420-4411<br>8901470 | $144,000 | 09/01/89<br>08/31/94 | 3 | Doctoral |

TOTAL : $ 288,000

National Needs Graduate Fellowships Program
Biotechnology, Plant

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | Alan B. Bennett | 89-38420-4402<br>8901432 | $96,000 | 09/01/89<br>08/31/94 | 2 Doctoral |
| Stanford University<br>Stanford, CA 94305 | Sharon R. Long | 89-38420-4394<br>8901404 | $144,000 | 09/01/89<br>08/31/94 | 3 Doctoral |

TOTAL : $ 240,000

National Needs Graduate Fellowships Program
Agriculture Engineering

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | Linda N. Wang | 89-38420-4396<br>8901406 | $144,000 | 09/01/89<br>08/31/94 | 3 | Doctoral |
| University of Maryland<br>College Park, MD 20742 | Fredrick Wheaton | 89-38420-4392<br>8901389 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |
| Michigan State University<br>East Lansing, MI 48824 | Gary Van Ee | 89-38420-4409<br>8901464 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |

National Needs Graduate Fellowships Program
Agriculture Engineering

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| Rutgers, The State University<br>New Brunswick, NJ 08903 | Daryl B. Lund | 89-38420-4413<br>8901473 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |
| Texas A&M Research Foundation<br>College Station, TX 77843 | Donald L. Reddell | 89-38420-4391<br>8901388 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |

TOTAL : $ 528,000

National Needs Graduate Fellowships Program
Food, Forest Products, or Agribusiness Mktg.

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| University of Illinois<br>Champaign, IL 61820 | Frederick W. Winter | 89-38420-4408<br>8901455 | $48,000 | 09/01/89<br>08/31/94 | 1 | Doctoral |
| Purdue Research Fdn.<br>West Lafayette, IN 47907 | B. Wade Brorsen | 89-38420-4403<br>8901436 | $144,000 | 09/01/89<br>08/31/94 | 3 | Doctoral |
| Michigan State University<br>East Lansing, MI 48824 | Stanley R. Thompson | 89-38420-4405<br>8901444 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |

National Needs Graduate Fellowships Program
Food, Forest Products, or Agribusiness Mktg.

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| Ohio State University Research Foundation Columbus, OH 43212 | Joseph Havlicek | 89-38420-4404 8901440 | $48,000 | 09/01/89 08/31/94 | 1 Doctoral |
| Oregon State University Corvallis, OR 97331 | A. Gene Nelson | 89-38420-4412 8901450 | $96,000 | 09/01/89 08/31/94 | 2 Doctoral |
| Texas A&M Research Foundation College Station, TX 77843 | Thomas L. Sporleder | 89-38420-4400 8901425 | $48,000 | 09/01/89 08/31/94 | 1 Doctoral |

National Needs Graduate Fellowships Program
Food, Forest Products, or Agribusiness Mktg.

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| Virginia Polytechnic Institute and State University Blacksburg, VA 24061 | Steven A. Sinclair | 89-38420-4401 8901427 | $48,000 | 09/01/89 08/31/94 | 1 Doctoral |

TOTAL : $ 528,000

National Needs Graduate Fellowships Program
Food Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER<br>PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD<br>FROM<br>TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| University of Illinois<br>Champaign, IL 61820 | A. J. Siedler | 89-38420-4395<br>8901405 | $78,440 | 09/01/89<br>08/31/94 | 2 Doctoral |
| North Carolina State University<br>Raleigh, NC 27695-7003 | Peggy M. Foegeding | 89-38420-4415<br>8901492 | $144,000 | 09/01/89<br>08/31/94 | 3 Doctoral |

TOTAL : $ 222,440

National Needs Graduate Fellowships Program
Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| University of California<br>Davis, CA 95616 | Robert B. Rucker | 89-38420-4419<br>8901498 | $144,000 | 09/01/89<br>08/31/94 | 3 Doctoral |
| Michigan State University<br>East Lansing, MI 48824 | Dale R. Romsos | 89-38420-4398<br>8901412 | $96,000 | 09/01/89<br>08/31/94 | 2 Doctoral |

TOTAL : $ 240,000

National Needs Graduate Fellowships Program
Food Science/Human Nutrition

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| University of Florida<br>Gainesville, FL 32611 | Lynn B. Bailey | 89-38420-4414<br>8901483 | $144,000 | 09/01/89<br>08/31/94 | 3 | Doctoral |
| Rutgers, The State University<br>New Brunswick, NJ 08903 | Daryl B. Lund | 89-38420-4418<br>8901496 | $48,000 | 09/01/89<br>08/31/94 | 1 | Doctoral |

TOTAL : $ 192,000

National Needs Graduate Fellowships Program
Water Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED |
|---|---|---|---|---|---|
| Colorado State University<br>Fort Collins, CO 80523 | Jim C. Loftis | 89-38420-4397<br>8901417 | $144,000 | 09/01/89<br>08/31/94 | 3 Doctoral |
| North Carolina State University<br>Raleigh, NC 27695-7003 | R. W. Skaggs | 89-38420-4417<br>8901495 | $96,000 | 09/01/89<br>08/31/94 | 2 Doctoral |
| University of Nebraska<br>Lincoln, NE 68588-0430 | Derrel L. Martin | 89-38420-4406<br>8901454 | $48,000 | 09/01/89<br>08/31/94 | 1 Doctoral |

National Needs Graduate Fellowships Program
Water Science

GRANTS AWARDED FOR FISCAL YEAR 1989

| ORGANIZATION | PRINCIPAL INVESTIGATOR | GRANT NUMBER PROPOSAL NUMBER | AMOUNT | AGREEMENT PERIOD FROM TO | FELLOWSHIPS SUPPORTED | |
|---|---|---|---|---|---|---|
| Cornell University<br>Ithaca, NY 14853 | Ray T. Oglesby | 89-38420-4407<br>8901453 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |
| Ohio State University<br>Research Foundation<br>Columbus, OH 43212 | Robert J. Gustafson | 89-38420-4393<br>8901395 | $96,000 | 09/01/89<br>08/31/94 | 2 | Doctoral |
| Oklahoma State University<br>Stillwater, OK 74078-0500 | Glenn O. Brown | 89-38420-4399<br>8901415 | $48,000 | 09/01/89<br>08/31/94 | 1 | Doctoral |

TOTAL : $ 528,000

# SCIENTISTS WHO SERVED ON USDA/CSRS PEER REVIEW PANELS FOR FISCAL YEAR 1989

Scientists from government, universities, and industry served on USDA/CSRS peer review panels this past year. Each panel was put together to fit the expertise needed for that specific granting area. The scientists involved are listed below alphabetically within their respective States.

## ALABAMA

Yolonda Brady
Auburn University

David E. Briles
University of Alabama

Edward M. Jenkins
University of Alabama

Victor Panangala
University of Alabama

John A. Plumb
Auburn University

Stephen P. Schmidt
Aurburn University

D. A. Stringfellow
University of Alabama

Douglas A. Weigent
University of Alabama

## ARIZONA

Robert E. Blankenship
Arizona State University

Hans J. Bohnert
University of Arizona

Henry H. Hagedorn
University of Arizona

Roger A. Sunde
University of Arizona

Elizabeth Vierling
University of Arizona

## ARKANSAS

Hubert Donovan Scott
University of Arkansas

## CALIFORNIA

Daniel Arp
University of California

## CALIFORNIA-continued

Ericka L. Barrett
University of California

Winslow R. Briggs
Carnegie Institution
of Washington

Bruce C. Campbell
USDA, ARS

Michael L. Christianson
Zeocon Research Institute

William O. Dawson
University of California

Pamela Dunsmuir
Advanced Genetic Sciences,
Inc.

Curtis D. Eckhert
University of California

Brian A. Federici
University of California

CALIFORNIA-continued

Graham Gall
University of California

Laurel J. Gershwin
University of California

David G. Gilchrist
University of California

Rasika M. Harshey
Research Institution of
Scripps Clinic

Jodie S. Holt
University of California

Carl L. Keen
University of California

J. Clark Lagarias
University of California

Mark A. Matthews
University of California

Edward G. Platzer
University of California

Daniel S. Straus
University of California

Phillip Thornber
University of California

CALIFORNIA-continued

Elaine M. Tobin
University of California

Linda Walling
University of California

Lloyd T. Wilson
University of California

Richard Yamamoto
University of California

COLORADO

Louis B. Bjostad
Colorado State University

James Collins
Colorado State University

Kenneth P. Dubrovin
Federal Land Bank

Robert P. Ellis
Colorado State University

Karel Grohmann
Solar Energy Research Unit

Merrill R. Kaufmann
FS, Rocky Mountain Forest &
Range Experiment Station

CONNECTICUT

Lindsay H. Allen
University of Connecticut

Paul K. Barten
Yale University

G. P. Berlyn
Yale University

Timothy M. Nelson
Yale University

DELAWARE

Forrest G. Chumley
Central Research &
Development

John E. Dohms
University of Delaware

George Lorimer
Central Research &
Development Experiment
Station

Douglas W. Tallamy
University of Delaware

DISTRICT OF COLUMBIA

Catherine Adams
USDA, FSIS

Richard Arnold
USDA, SCS

Peter Brayton
USDA, CSRS

Richard G. Cline
USDA, FS

Daniel W. Drell
George Washington University

W. Lamar Harris
USDA, CSRS

Ariel Hollinshead
George Washington University

Daniel Jones
USDA, OAB

Gary McIntyre
USDA, CSRS

Tim Morck
International Life Sciences Institute

Tom Mulvaney
Food & Drug Administration

DISTRICT OF COLUMBIA-cont.

W. K. Murphey
USDA, CSRS

Lester Myers
USDA, ERS

Harold Ricker
USDA, AMS

Berlie Schmidt
USDA, CSRS

Wayne Sharp
USDA, FAS

Jimmy Wise
USDA, AMS

FLORIDA

Murray Brown
University of Florida

Robert J. Cousins
University of Florida

Patrick D. Greany
Insect Attractants, Behavior & Basic

L. Curtis Hannah
University of Florida

FLORIDA-continued

Lonnie G. Ingram
University of Florida

William Outlaw, Jr.
Florida State University

Mary Jane Saunders
University of South Florida

Ronald Schmidt
University of Florida

Donald R. Strong, Jr.
Florida State University

GEORGIA

James L. Butler
USDA, ARS

Paul Doetsch
Emory University

Dean Richard Evert
Coastal Plain Experiment Station

Gary P. Green
University of Georgia

Charles Magee
Fort Valley State College

GEORGIA-continued

Russell L. Malmberg
University of Georgia

Lois K. Miller
University of Georgia

James Moore
University of Georgia

William L. Ragland
University of Georgia

Chris J. B. Smit
University of Georgia

IDAHO

S. B. Bunting
University of Idaho

ILLINOIS

Anne E. Desjardins
USDA, ARS

James Harper
University of Illinois

Walter L. Hurley
University of Illinois

Michael E. Irwin
University of Illinois

ILLINOIS-continued

Gary L. Jackson
University of Illinois

Barbara P. Klein
University of Illinois

Gayle Lamppa
University of Chicago

Sandra J. Legan
Northwestern University

Emerson D. Nafziger
University of Illinois

Donald R. Ort
University of Illinois

Mary F. Picciano
University of Illinois

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